MillLine

www.tungaloy.com

MILLING

High-Feed Milling D002

Shoulder Milling D032

Face Milling D116

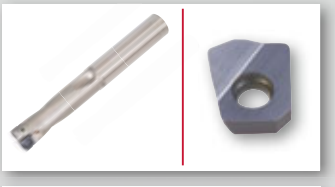
Slot Milling D170

Profile Milling D186

Multi-Functional Milling D222

Milling Insert D312

MillLine - High-Feed Milling



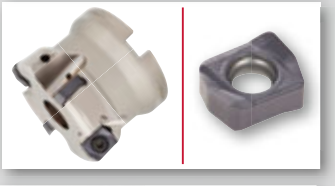
HYBRIDTACMILL EXH

D004

High-feed endmills

20° ø10 - ø16 mm
max. ap 0.8 mm

P M K N



DOFEED

D008

Super high-feed milling cutters with 4-cornered double-sided inserts

15° ø16 - ø200 mm
max. ap 1.5 mm

P M K S H

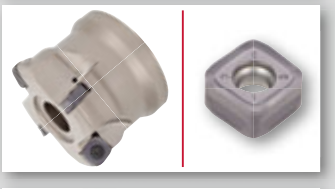
DO TWIST BALL

D016

Super high-feed cutters for profile milling with rigid clamping

20° ø20 - ø50 mm
max. ap 1.3 mm

P M K S H



DOFEEDQUAD

D021

Super high-feed cutters for face milling with 8-cornered double-sided inserts

13° ø50 - ø125 mm
max. ap 2 mm

P M K S H

MILLQUADFEED

D024

Super high-feed milling cutters for large depths of cut

14° ø50 - ø160 mm
max. ap 2.5 mm

P M K S H

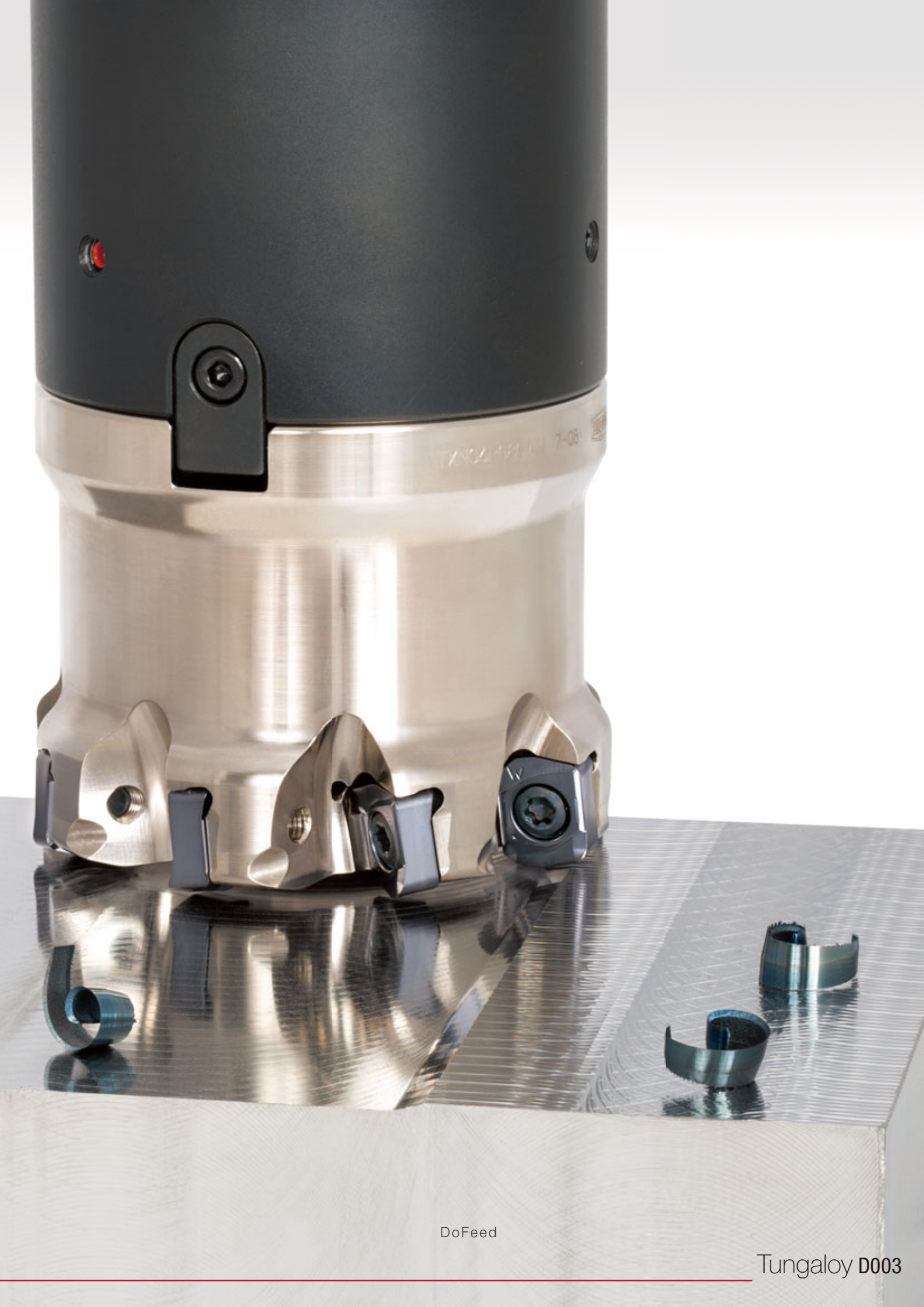
MILLFEED TXP

D026

High-feed milling cutters with single-sided inserts

10°-20° ø20 - ø160 mm
max. ap 3 mm

P M K H



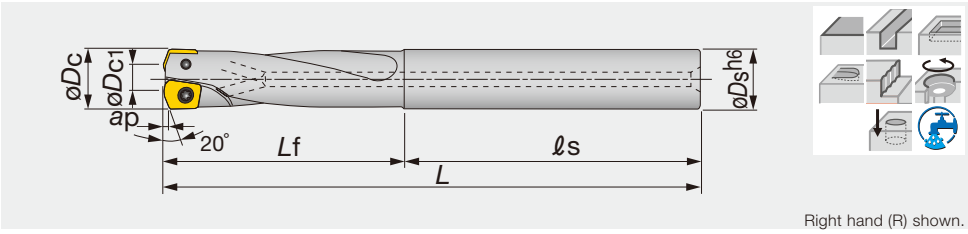
DoFeed

HYBRIDTACMILL

EXH

Super high feed milling endmills with center cutting edge

A.R. = +20°, R.R. = +12°

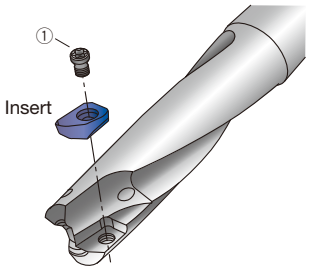


Right hand (R) shown.

Designation	Max. ap	øDc	z	øDc1	øDs	L	Lf	ℓs	Insert
EXH06R010M10.0-02	0.6	10	2	5	10	90	40	50	XXGT06H2...
EXH07R012M12.0-02	0.6	12	2	7	12	98	48	50	XXGT07X3...
EXH09R016M16.0-02	0.8	16	2	10	16	124	64	60	XXGT09X4...

SPARE PARTS

Designation	①Clamping screw	Lubricant	Wrench	Wrench 1
EXH06R010M10.0-02	CSPD-1.8S	M-1000	-	IP-6F
EXH07R012M12.0-02	CSPB-2H	M-1000	-	IP-6F
EXH09R016M16.0-02	CSPB-2.5S	M-1000	IP-8D	-

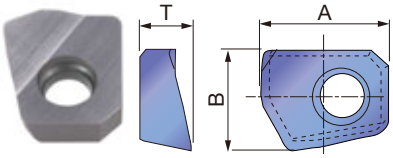


Reference pages

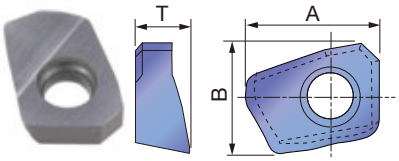
Inserts, Standard cutting conditions → **D005**

INSERT

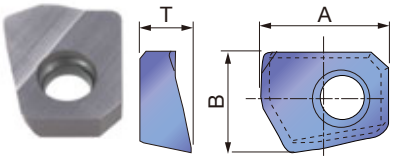
XXGT EC-MJ (Center cutting edge)



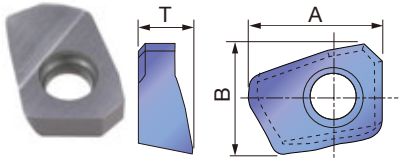
XXGT EP-MJ (Peripheral cutting edge)



XXGT FC-AJ (Center cutting edge)



XXGT FP-AJ (Peripheral cutting edge)



P	Steel	★	
M	Stainless	★	
K	Cast iron	★	
N	Non-ferrous		★
S	Superalloys		
H	Hard materials		

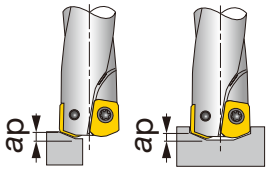
★ : First choice
☆ : Second choice

Designation	Max. ap	Coated AH730	Coated DS1200	A	B	T
XXGT06H205EC-MJ	0.6	●		6.2	4.9	2.5
XXGT07X305EC-MJ	0.6	●		7	5.9	3
XXGT09X408EC-MJ	0.8	●		8.9	7.9	4
XXGT06H205FC-AJ	0.6		●	6.2	4.9	2.5
XXGT07X305FC-AJ	0.6		●	7	5.9	3
XXGT09X408FC-AJ	0.8		●	8.9	7.9	4
XXGT06H205EP-MJ	0.6	●		6.2	5.1	2.5
XXGT07X305EP-MJ	0.6	●		7	6.3	3
XXGT09X408EP-MJ	0.8	●		8.9	8	4
XXGT06H205FP-AJ	0.6		●	6.2	5.1	2.5
XXGT07X305FP-AJ	0.6		●	7	6.3	3
XXGT09X408FP-AJ	0.8		●	8.9	8	4

●: Line up

STANDARD CUTTING CONDITIONS

●Shoulder milling, Slotting

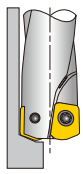


Side cutting Slotting

ap: Axial depth of cut

Workpiece material		Carbon steels and alloy steels		Alloy steels and prehardened steels		Stainless steels		Cast irons		Aluminium alloys (Si < 13%)		Aluminium alloys (Si ≥ 13%)	
Hardness		< 30HRC		30 ~ 40HRC		< 250HB		–		–		–	
Cutting speed		Vc = 100 ~ 300 m/min		Vc = 100 ~ 250 m/min		Vc = 100 ~ 300 m/min		Vc = 100 ~ 300 m/min		Vc = 100 ~ 500 m/min		Vc = 100 ~ 300 m/min	
Conditions		No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min
Tool dia. (mm)	ø10	4770	1430	3820	760	4770	1430	6360	2540	9550	5730	6360	3180
	ø12	3980	1190	3180	630	3980	1190	5300	2120	7950	4770	5300	2650
	ø16	2980	890	2380	470	2980	890	3970	1580	5960	3570	3970	1980
Depth of cut	ø10	ap < 0.6		ap < 0.5		ap < 0.6		ap < 0.6		ap < 0.6		ap < 0.6	
	ø12	ap < 0.6		ap < 0.5		ap < 0.6		ap < 0.6		ap < 0.6		ap < 0.6	
	ø16	ap < 0.8		ap < 0.6		ap < 0.8		ap < 0.8		ap < 0.8		ap < 0.8	

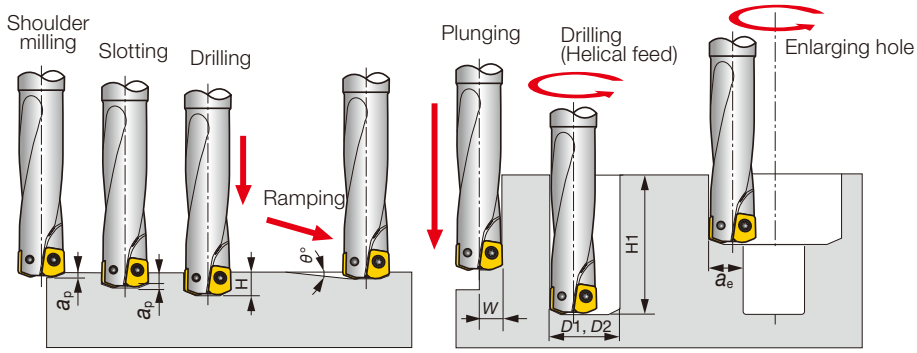
●Plunging



Workpiece material		Carbon steels and alloy steels		Alloy steels and prehardened steels		Stainless steels		Cast irons		Aluminium alloys (Si < 13%)		Aluminium alloys (Si ≥ 13%)	
Hardness		< 30HRC		30 ~ 40HRC		< 250HB		–		–		–	
Cutting speed		Vc = 100 ~ 300 m/min		Vc = 100 ~ 250 m/min		Vc = 100 ~ 300 m/min		Vc = 100 ~ 300 m/min		Vc = 100 ~ 500 m/min		Vc = 100 ~ 300 m/min	
Conditions		No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min	No. of rev. n min⁻¹	Feed speed Vf mm/min
Tool dia. (mm)	ø10	4770	240	3820	150	4770	240	6360	440	9550	760	6360	440
	ø12	3980	200	3180	130	3980	200	5300	370	7950	640	5300	370
	ø16	2980	150	2380	95	2980	150	3970	280	5960	480	3970	280

Note:
- In slotting or pocketing where chips tend to stay in the cutting zone, use an air blast to remove chips for preventing chip recutting.
- When chips tend to weld excessively on the cutting edge such as in machining aluminium alloys, use a water soluble cutting fluid.
- In the case of cutting a casting skin or a heavily interrupted work surface, decrease the feed per tooth and the maximum depth of cut to 1/2 to 2/3 times the values shown in the table.
- Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.
- Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure that the machine is running normally.

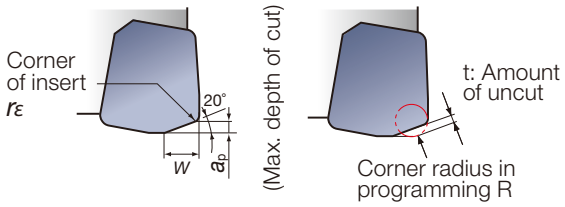
APPLICATION RANGE



Designation	Tool dia. øDc	Max. depth of cut ap	Max.depth of drilling H	Max. cutting width in plunging W	Max. ramping angle θ°	Min. machinable hole dia. D1	Max. machinable hole dia. D2	Max. cutting width in enlarging hole ae	Max.depth of boring H1
EXH06R010M10.0-02	10	0.6	5	5	5	12	19	7	30
EXH07R012M12.0-02	12	0.6	6	6	5	14	23	9	36
EXH09R016M16.0-02	16	0.8	8	8	5	18	31	12.5	48

TOOL GEOMETRY FOR PROGRAMMING

When using CAD/CAM, please program it for radius cutter.
The following table shows actual cutting edge geometry and amount of unfinished work cut.



Designation	øDc	Max. depth of cut ap	Corner of insert rε	Width W	Amount of uncut t	Corner radius in programming R
EXH06R010M10.0-02	10	0.6	0.5	2.5	0.7	R0.5
					0.6	R1.0
EXH07R012M12.0-02	12	0.6	0.5	2.5	0.7	R0.5
					0.6	R1.0
EXH09R016M16.0-02	16	0.8	0.8	3	0.8	R0.5
					0.7	R1.0
					0.6	R1.5

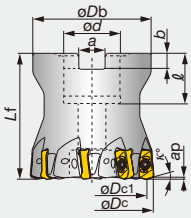
MEMO

DOFEED

TXN03

Super high feed milling cutters with double sided inserts with 4 edges

A.R. = +6°, R.R. = +12° ~ 13°



Designation	Max. ap	øDc	z	øDc1	øDb	ød	ℓ	Lf	b	a	κ°	Kg	Air hole	Insert
TXN03R040M16.0E05	1	40	5	33.6	35	16	18	40	5.6	8.4	17	0.2	with	LNMU03...
TXN03R040M16.0E06	1	40	6	33.6	35	16	18	40	5.6	8.4	17	0.2	with	LNMU03...
TXN03R050M22.0E05	1	50	5	43.6	47	22	20	50	6.3	10.4	17	0.5	with	LNMU03...
TXN03R050M22.0E08	1	50	8	43.6	47	22	20	50	6.3	10.4	17	0.5	with	LNMU03...

SPARE PARTS

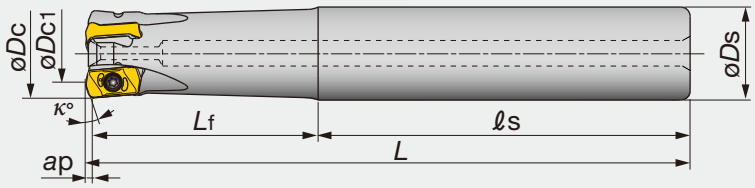
Designation	Clamping screw	Lubricant	Center bolt	Wrench
TXN03R04...	CSPB-2.5	M-1000	CM8X30H	IP-8D
TXN03R05...	CSPB-2.5	M-1000	CM10X30H	IP-8D

DOFEED

EXN03

Super high feed milling endmills with double sided inserts with 4 edges

A.R. = +6°, R.R. = +5° ~ +11°



Designation	Max. ap	øDc	z	øDc1	øDs	L	Lf	ℓs	κ°	Kg	Air hole	Insert
EXN03R016M16.0-02	1	16	2	9.6	16	100	30	70	15	0.2	with	LNMU03...
EXN03R016M16.0-02L	1	16	2	9.6	16	150	50	100	15	0.2	with	LNMU03...
EXN03R018M16.0-02	1	18	2	11.5	16	100	30	70	17	0.2	with	LNMU03...
EXN03R018M16.0-02L	1	18	2	11.5	16	150	25	125	17	0.2	with	LNMU03...
EXN03R020M20.0-03	1	20	3	13.5	20	130	50	80	17	0.3	with	LNMU03...
EXN03R020M20.0-03L	1	20	3	13.5	20	160	80	80	17	0.3	with	LNMU03...
EXN03R020M20.0-04	1	20	4	13.5	20	130	50	80	17	0.3	with	LNMU03...
EXN03R022M20.0-03	1	22	3	15.5	20	130	50	80	17	0.3	with	LNMU03...
EXN03R022M20.0-03L	1	22	3	15.5	20	160	30	130	17	0.4	with	LNMU03...
EXN03R022M20.0-04	1	22	4	15.5	20	130	50	80	17	0.3	with	LNMU03...
EXN03R025M25.0-04	1	25	4	18.5	25	140	60	80	17	0.5	with	LNMU03...
EXN03R025M25.0-04L	1	25	4	18.5	25	180	100	80	17	0.6	with	LNMU03...
EXN03R025M25.0-05	1	25	5	18.5	25	140	60	80	17	0.5	with	LNMU03...
EXN03R028M25.0-04	1	28	4	21.5	25	140	60	80	17	0.5	with	LNMU03...
EXN03R028M25.0-04L	1	28	4	21.5	25	180	35	145	17	0.7	with	LNMU03...
EXN03R028M25.0-05	1	28	5	21.5	25	140	60	80	17	0.5	with	LNMU03...
EXN03R030M32.0-04	1	30	4	23.5	32	150	70	80	17	0.8	with	LNMU03...
EXN03R030M32.0-04L	1	30	4	23.5	32	200	120	80	17	0.9	with	LNMU03...
EXN03R030M32.0-05	1	30	5	23.5	32	150	70	80	17	0.8	with	LNMU03...
EXN03R032M32.0-05	1	32	5	25.5	32	150	70	80	17	0.8	with	LNMU03...
EXN03R032M32.0-05L	1	32	5	25.5	32	200	120	80	17	1.1	with	LNMU03...
EXN03R032M32.0-06	1	32	6	25.5	32	150	70	80	17	0.9	with	LNMU03...
EXN03R035M32.0-05	1	35	5	28.5	32	150	35	115	17	0.9	with	LNMU03...
EXN03R035M32.0-05L	1	35	5	28.5	32	200	35	165	17	1.2	with	LNMU03...
EXN03R035M32.0-06	1	35	6	28.5	32	150	35	115	17	0.9	with	LNMU03...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EXN03...	CSPB-2.5	M-1000	IP-8D

Reference pages

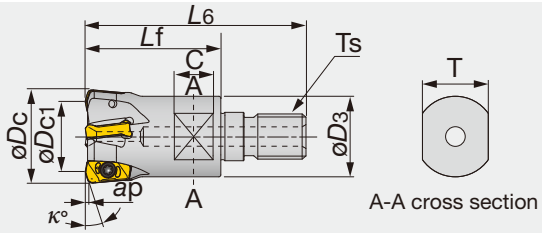
Inserts → **D009**, Standard cutting conditions → **D010 - D011**

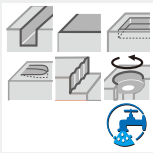
DOFEED

HXN03-M

Super high feed milling endmills (Dofeed) with TungFlex

A.R. = +6°, R.R. = +5° ~ +11°





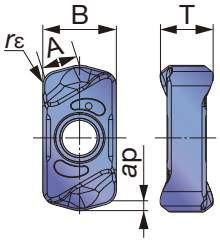
Designation	Max. ap	øDc	z	øDc1	L6	Lf	C	T	øD3	κ°	Ts	Kg	Air hole	Insert
HXN03R016MM08-02	1	16	2	9.6	42	25	8	10	12.8	15	M8	0.03	with	LNMU03...
HXN03R018MM08-02	1	18	2	11.5	42	25	8	10	14.5	17	M8	0.04	with	LNMU03...
HXN03R020MM10-03	1	20	3	13.5	49	30	10	15	17.8	17	M10	0.06	with	LNMU03...
HXN03R020MM10-04	1	20	4	13.5	49	30	10	15	17.8	17	M10	0.06	with	LNMU03...
HXN03R022MM10-03	1	22	3	15.5	49	30	10	15	17.8	17	M10	0.06	with	LNMU03...
HXN03R022MM10-04	1	22	4	15.5	49	30	10	15	17.8	17	M10	0.07	with	LNMU03...
HXN03R025MM12-04	1	25	4	18.5	57	35	10	17	20.8	17	M12	0.1	with	LNMU03...
HXN03R025MM12-05	1	25	5	18.5	57	35	10	17	20.8	17	M12	0.11	with	LNMU03...
HXN03R028MM12-04	1	28	4	21.5	57	35	10	17	23	17	M12	0.12	with	LNMU03...
HXN03R028MM12-05	1	28	5	21.5	57	35	10	17	23	17	M12	0.12	with	LNMU03...
HXN03R030MM16-04	1	30	4	23.5	63	40	12	22	28.8	17	M16	0.19	with	LNMU03...
HXN03R030MM16-05	1	30	5	23.5	63	40	12	22	28.8	17	M16	0.2	with	LNMU03...
HXN03R032MM16-05	1	32	5	25.5	63	40	12	22	28.8	17	M16	0.2	with	LNMU03...
HXN03R032MM16-06	1	32	6	25.5	63	40	12	22	28.8	17	M16	0.21	with	LNMU03...

SPARE PARTS

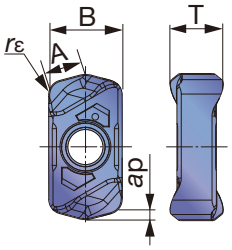
Designation	Clamping screw	Lubricant	Wrench
HXN03...	CSPB-2.5	M-1000	IP-8D

INSERT

LNMU03-MJ (for general purpose)



LNMU03-ML (for low cutting force)



P	Steel			★	☆
M	Stainless			★	
K	Cast iron		★		☆
N	Non-ferrous				
S	Superalloys	★	☆		☆
H	Hard materials		☆	☆	★

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH130	AH725	AH3035	AH8015	A	B	T
LNMU0303ZER-MJ	1.2	1	●	●	●	●	3.2	6	4.3
LNMU0303ZER-ML	1.2	1	●	●	●	●	3.2	6	4.3

●: Line up

Reference pages

Standard cutting conditions → **D010 - D011**

STANDARD CUTTING CONDITIONS TXN03/EXN03/HXN03

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool dia.: *øDc* (mm) ø16 ~ ø22	ø25 ~ ø50	Plunging	ø16, z = 2 *n*	ø16, z = 2 *Vf*	ø18, z = 2 *n*	ø18, z = 2 *Vf*	ø20 *n*	ø20 *Vf* z = 3	ø20 *Vf* z = 4
P	Carbon steels (C45, C55 etc.)	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
		~ 300HB	for wear resistance	AH8015	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
	Alloy steels (42CrMo4, 17Cr3 etc.)	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
		~ 300HB	for wear resistance	AH8015	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 150 m/min, *fz* = 0.7 mm/t						
	Prehardened steels (NAK80, PX5 etc.)	30 ~ 40HRC	First choice	AH3035	ML	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
										Vc = 150 m/min, *fz* = 0.8 mm/t						
		30 ~ 40HRC	for impact resistance	AH3035	MJ	100 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	4,770	2,650	4,240	2,390	5,740	7,650
										Vc = 150 m/min, *fz* = 0.7 mm/t						
		30 ~ 40HRC	for wear resistance	AH8015	ML	100 - 200	0.5 - 1.0	0.5 - 1.0	0.1	2,980	4,170	2,650	3,710	2,390	5,020	6,690
										Vc = 150 m/min, *fz* = 0.7 mm/t						
M	Stainless steels (X5CrNi18-10, X5CrNiMo17-12-2 etc.)	~ 200HB	First choice	AH3035	ML	100 - 150	0.3 - 0.7	0.3 - 0.7	0.08	2,390	1,910	2,120	1,700	1,910	2,290	3,060
										Vc = 120 m/min, *fz* = 0.4 mm/t						
		~ 200HB	for impact resistance	AH3035	MJ	100 - 150	0.3 - 0.8	0.3 - 0.8	0.08	2,390	2,390	2,120	2,120	1,910	2,870	3,820
										Vc = 120 m/min, *fz* = 0.5 mm/t						
K	Gray cast irons (GG25, GG30 etc.)	150 ~ 250HB	First choice	AH725	MJ	100 - 300	0.5 - 1.2	0.5 - 1.5	0.1	3,980	6,370	3,540	5,660	3,180	7,630	10,180
										Vc = 200 m/min, *fz* = 0.8 mm/t						
		150 ~ 250HB	for wear resistance	AH8015	MJ	100 - 300	0.5 - 0.7	0.5 - 1.0	0.1	3,980	4,780	3,540	4,250	3,180	5,720	7,630
										Vc = 200 m/min, *fz* = 0.6 mm/t						
	Ductile cast irons (GGG40 etc.)	150 ~ 250HB	First choice	AH725	MJ	80 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	4,770	2,650	4,240	2,390	5,740	7,650
										Vc = 150 m/min, *fz* = 0.8 mm/t						
		150 ~ 250HB	for wear resistance	AH8015	MJ	80 - 200	0.5 - 1.2	0.5 - 1.5	0.1	2,980	3,580	2,650	3,180	2,390	4,300	5,740
										Vc = 150 m/min, *fz* = 0.6 mm/t						
S	Titanium alloy (Ti-6Al-4V etc.)	~ 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.3 - 0.7	0.08	800	640	710	570	640	770	1,020
										Vc = 40 m/min, *fz* = 0.4 mm/t						
		~ 40HRC	for impact resistance	AH130	MJ	30 - 60	0.3 - 0.7	0.3 - 0.7	0.08	800	640	710	570	640	770	1,020
										Vc = 40 m/min, *fz* = 0.4 mm/t						
	Heat-resistance alloy (Inconel, Hasteroy etc.)	~ 40HRC	First choice	AH725	ML	20 - 50	0.1 - 0.3	0.1 - 0.3	0.05	600	240	530	210	480	290	380
										Vc = 30 m/min, *fz* = 0.2 mm/t						
		~ 40HRC	for wear resistance	AH8015	ML	20 - 50	0.1 - 0.3	0.1 - 0.3	0.05	600	240	530	210	480	290	380
										Vc = 30 m/min, *fz* = 0.2 mm/t						
H	Hot mold steel (X40CrMoV5-1 etc.)	40 ~ 50HRC	First choice	AH8015	MJ	80 - 150	0.1 - 0.2	0.1 - 0.5	0.05	1,990	1,190	1,770	1,060	1,970	1,770	2,360
										Vc = 100 m/min, *fz* = 0.3mm/t						
		50 ~ 60HRC	for impact resistance	AH3035	MJ	80 - 150	0.03 - 0.05	0.1 - 0.3	0.05	1,990	800	1,770	710	1,970	1,180	1,580
										Vc = 100 m/min, *fz* = 0.2 mm/t						
	Cold mold steel (X153CrMoV12 etc.)	50 ~ 60HRC	First choice	AH8015	MJ	50 - 70	0.1 - 0.2	0.05 - 0.2	0.03	1,190	290	1,060	250	950	340	450
										Vc = 60 m/min, *fz* = 0.12 mm/t						
		50 ~ 60HRC	for impact resistance	AH725	MJ	50 - 70	0.03 - 0.05	0.03 - 0.07	0.03	1,190	100	1,060	80	950	110	150
										Vc = 60 m/min, *fz* = 0.04 mm/t						

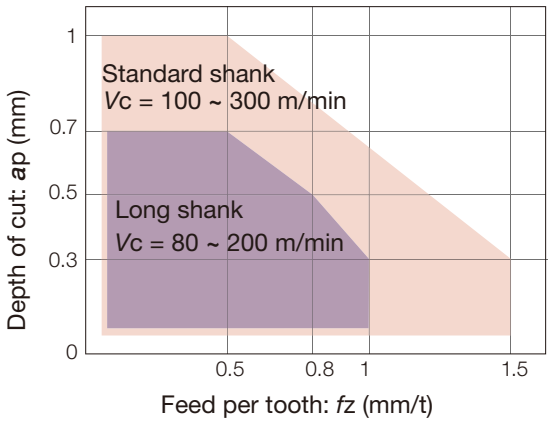
· When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area.

· Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.

CAUTIONARY POINTS IN USE

The use of a standard or long shank

When using a long shank, please lower the cutting conditions (*Vc*, *fz*, *ap*) to 70% of the maximum conditions for the standard shank.



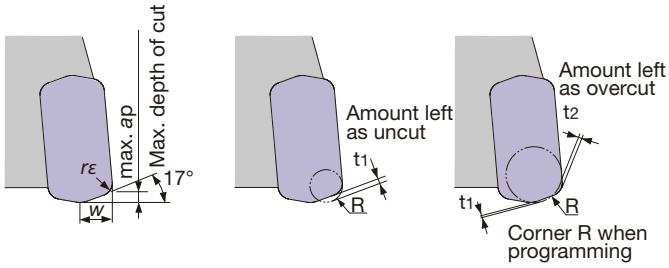
Tool dia.: *øDc* = ø16 ~ 35 mm — Standard shank: L/D ≤ 3

Workpiece material: C55 (200HB) — Long shank: L/D = 4

L/D ratio of overhang

Tool geometry for programming

When programming for CAM, the tool should be considered as a radius cutters. Usually, the corner radius should be set as R = 1.5 mm. If a larger radius is used, overcutting will occur. The following table shows the amount left as uncut (t_1) and overcut (t_2).



Max. depth of cut max. ap	Corner radius r_ε	*W* (mm)	Corner R when programming	Amount left as uncut t_1	Amount left as overcut t_2
1	1.2	3	1	0.6	-
			1.5	0.5	-
			2	0.25	0.08
			2.5	0.14	0.26

Each value in table is calculated theoretically at the maximum condition.

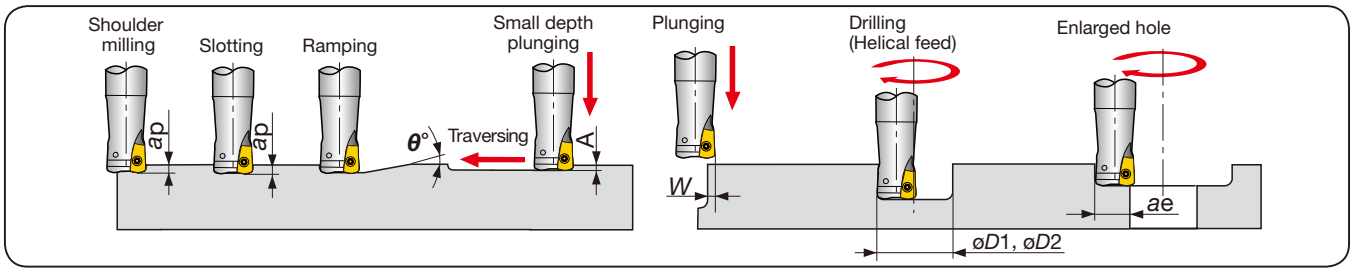
Tool dia.: ø*Dc* (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Max. depth of cut: *ap* = 1.0 mm

ø22			ø25			ø28			ø30			ø32			ø35			ø40			ø50		
n	*Vf*		*n*	*Vf*		*n*	*Vf*		*n*	*Vf*		*n*	*Vf*		*n*	*Vf*		*n*	*Vf*		*n*	*Vf*	
	z = 3	z = 4		z = 4	z = 5		z = 4	z = 5		z = 4	z = 5		z = 5	z = 6		z = 5	z = 6		z = 5	z = 6		z = 5	z = 8
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1 mm/t																							
2,170	4,560	6,080	1,910	5,350	6,690	1,710	4,790	5,990	1,590	4,450	5,570	1,490	5,220	6,260	1,360	4,760	5,710	1,190	4,170	5,000	950	3,330	5,320
Vc = 150 m/min, *fz* = 0.7 mm/t																							
2,170	5,210	6,940	1,910	7,640	9,550	1,710	6,840	8,550	1,590	6,360	7,950	1,490	7,450	8,940	1,360	6,800	8,160	1,190	5,950	7,140	950	4,750	7,600
Vc = 150 m/min, *fz* = 1 mm/t																							
2,170	4,560	6,080	1,910	5,350	6,690	1,710	4,790	5,990	1,590	4,450	5,570	1,490	5,220	6,260	1,360	4,760	5,710	1,190	4,170	5,000	950	3,330	5,320
Vc = 150 m/min, *fz* = 0.7 mm/t																							
1,740	2,090	2,780	1,530	2,450	3,060	1,360	2,180	2,730	1,270	2,540	3,180	1,190	2,980	3,570	1,090	2,730	3,270	950	2,380	2,850	760	1,900	3,040
Vc = 120 m/min, *fz* = 0.5 mm/t																							
1,740	2,610	3,480	1,530	3,060	3,820	1,360	2,730	3,410	1,270	3,050	3,810	1,190	3,570	4,280	1,090	3,270	3,920	950	2,850	3,420	760	2,280	3,650
Vc = 120 m/min, *fz* = 0.6 mm/t																							
2,890	6,940	9,250	2,550	8,160	10,180	2,270	7,280	9,100	2,120	8,480	10,600	1,990	9,950	11,940	1,820	9,100	10,920	1,590	7,950	9,540	1,270	6,350	10,160
Vc = 200 m/min, *fz* = 1 mm/t																							
2,890	5,200	6,940	2,550	6,110	7,640	2,270	5,460	6,820	2,120	6,780	8,480	1,990	7,960	9,550	1,820	7,280	8,740	1,590	6,360	7,630	1,270	5,080	8,130
Vc = 150 m/min, *fz* = 0.8 mm/t																							
2,170	5,210	6,940	1,910	6,110	7,640	1,710	5,460	6,820	1,590	6,360	7,950	1,490	7,450	8,940	1,360	6,800	8,160	1,190	5,950	7,140	950	4,750	5,700
Vc = 150 m/min, *fz* = 1 mm/t																							
2,170	3,910	5,210	1,910	6,110	7,640	1,710	5,460	6,820	1,590	6,360	7,950	1,490	7,450	8,940	1,360	6,800	8,160	1,190	5,950	7,140	950	4,750	5,700
Vc = 150 m/min, *fz* = 1 mm/t																							
580	700	930	510	820	1,020	450	730	910	420	840	1,050	400	1,000	1,200	360	900	1,080	320	800	960	250	630	1,000
Vc = 40 m/min, *fz* = 0.5 mm/t																							
580	700	930	510	820	1,020	450	730	910	420	840	1,050	400	1,000	1,200	360	900	1,080	320	800	960	250	630	1,000
Vc = 40 m/min, *fz* = 0.5 mm/t																							
430	260	340	380	230	290	340	200	260	320	260	320	300	300	360	270	270	320	240	240	290	190	190	300
Vc = 30 m/min, *fz* = 0.2 mm/t																							
430	260	340	380	230	290	340	200	260	320	260	320	300	300	360	270	270	320	240	240	290	190	190	300
Vc = 30 m/min, *fz* = 0.2 mm/t																							
2,160	1,940	2,590	1,270	1,520	1,900	1,140	1,370	1,710	1,060	1,270	1,590	990	1,490	1,780	910	1,370	1,640	800	1,200	1,440	640	960	1,540
Vc = 100 m/min, *fz* = 0.3 mm/t																							
2,160	1,300	1,730	1,270	1,020	1,270	1,140	910	1,140	1,060	850	1,060	990	990	1,190	910	910	1,090	800	800	960	640	640	1,020
Vc = 100 m/min, *fz* = 0.2 mm/t																							
870	310	420	760	300	380	680	270	340	640	260	320	600	300	360	550	230	340	480	240	280	380	200	300
Vc = 60 m/min, *fz* = 0.1 mm/t																							
870	100	140	760	120	150	680	110	140	640	100	130	600	120	140	550	110	130	480	100	120	380	80	120
Vc = 60 m/min, *fz* = 0.04 mm/t																							

· The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

· Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

APPLICATION RANGE



Designation	Tool dia. ø*Dc*	Max. depth of cut Max *ap*	Max. ramping angle *θ*°	Max. plunging depth A	Max. cutting width in plunging *W*	Min.machinable hole dia. ø*D1*	Max.machinable hole dia. ø*D2*	Max. cutting width in enlarged hole *ae*
E/HXN03R016M...	ø16	1	2.1	0.3	3.5	22	30	12.5
E/HXN03R018M...	ø18	1	1.7	0.3	3.5	26	34	14.5
E/HXN03R020M...	ø20	1	1.4	0.3	3.5	30	38	16.5
E/HXN03R022M...	ø22	1	1.2	0.3	3.5	34	42	18.5
E/HXN03R025M...	ø25	1	1.0	0.3	3.5	40	48	21.5
E/HXN03R028M...	ø28	1	0.8	0.3	3.5	46	54	24.5
E/HXN03R030M...	ø30	1	0.7	0.3	3.5	50	58	26.5
E/HXN03R032M...	ø32	1	0.7	0.3	3.5	54	62	28.5
EXN03R035M...	ø35	1	0.6	0.3	3.5	60	68	31.5
TXN03R040M...	ø40	1	0.5	0.3	3.5	70	78	36.5
TXN03R050M...	ø50	1	0.4	0.3	3.5	90	98	46.5

· For ø*Dc* above 33 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut.

DOFEED

TXN06

Super high feed milling cutters with double sided inserts with 4 edges

A.R. = +10°, R.R. = +2° ~ +6°

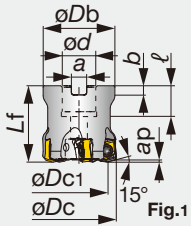


Fig.1

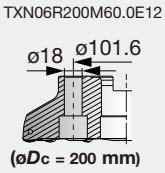


Fig.2

Designation	Max. ap	øDc	z	øDc1	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert	Fig.
TXN06R050M22.0E04	1.5	50	4	37.6	47	50	22	20	10.4	6.3	0.4	with	LN*U06...	1
TXN06R050M22.0E05	1.5	50	5	37.6	47	50	22	20	10.4	6.3	0.4	with	LN*U06...	1
TXN06R052M22.0E04	1.5	52	4	39.6	49	50	22	20	10.4	6.3	0.5	with	LN*U06...	1
TXN06R052M22.0E05	1.5	52	5	39.6	49	50	22	20	10.4	6.3	0.5	with	LN*U06...	1
TXN06R063M22.0E04	1.5	63	4	50.6	59	50	22	20	10.4	6.3	0.8	with	LN*U06...	1
TXN06R063M22.0E06	1.5	63	6	50.6	59	50	22	20	10.4	6.3	0.8	with	LN*U06...	1
TXN06R066M27.0E04	1.5	66	4	53.6	63	50	27	22	12.4	7	0.8	with	LN*U06...	1
TXN06R066M27.0E06	1.5	66	6	53.6	63	50	27	22	12.4	7	0.8	with	LN*U06...	1
TXN06R080M27.0E05	1.5	80	5	67.6	76	63	27	22	12.4	7	1.6	with	LN*U06...	1
TXN06R080M27.0E08	1.5	80	8	67.6	76	63	27	22	12.4	7	1.6	with	LN*U06...	1
TXN06R100M32.0E06	1.5	100	6	87.6	96	63	32	25	14.4	8	2.2	with	LN*U06...	1
TXN06R125M40.0E08	1.5	125	8	112.6	100	63	40	37	16.4	9	3	with	LN*U06...	1
TXN06R160M40.0E10	1.5	160	10	147.6	100	63	40	37	16.4	9	5	with	LN*U06...	1
TXN06R200M60.0E12	1.5	200	12	187.6	130	63	60	38	25.7	14	7.2	without	LN*U06...	2

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Center bolt 1	Torx bit
TXN06R050M22.0...	CSPB-5	H-TB2W	M-1000	-	FSHM10-40H	BLDIP20/S7
TXN06R052M22.2...	CSPB-5	H-TB2W	M-1000	-	FSHM10-40H	BLDIP20/S7
TXN06R063M...	CSPB-5	H-TB2W	M-1000	-	CM10X30H	BLDIP20/S7
TXN06R066,080M27.0...	CSPB-5	H-TB2W	M-1000	-	CM12X30H	BLDIP20/S7
TXN06R100M...	CSPB-5	H-TB2W	M-1000	-	CM16X40H	BLDIP20/S7
TXN06R125M...	CSPB-5	H-TB2W	M-1000	TMBA-M20H	-	BLDIP20/S7
TXN06R160M40.0...	CSPB-5	H-TB2W	M-1000	TMBA-M20H	-	BLDIP20/M7
TXN06R200M60.0...	CSPB-5	H-TB2W	M-1000	-	-	BLDIP20/M7

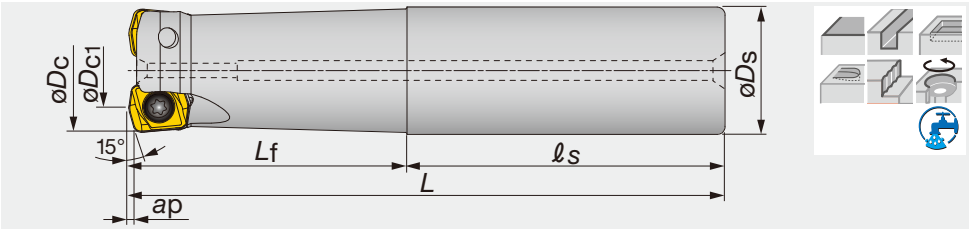
Reference pages

Inserts → **D013**, Standard cutting conditions → **D014 - D015**

DOFEED
EXN06

Super high feed milling endmills with double sided inserts with 4 edges

A.R. = +10°, R.R. = -2° ~ +6°



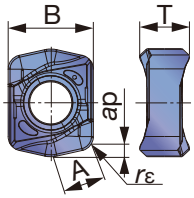
Designation	Max. ap	øDc	z	øDc1	øDs	L	Lf	ℓs	Kg	Air hole	Insert
EXN06R032M32.0-02	1.5	32	2	19.7	32	150	70	80	0.8	with	LN*U06...
EXN06R032M32.0-02L	1.5	32	2	19.7	32	200	120	80	1.1	with	LN*U06...
EXN06R035M32.0-02	1.5	35	2	22.7	32	150	45	105	0.9	with	LN*U06...
EXN06R035M32.0-02L	1.5	35	2	22.7	32	200	45	155	1.2	with	LN*U06...
EXN06R040M32.0-03	1.5	40	3	27.7	32	150	45	105	0.9	with	LN*U06...
EXN06R040M32.0-03L	1.5	40	3	27.7	32	220	45	175	1.3	with	LN*U06...

SPARE PARTS

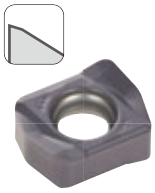
Designation	Clamping screw	Lubricant	Wrench
EXN06	CSPB-5	M-1000	IP-20D

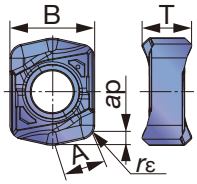
INSERT

LNMU06-MJ

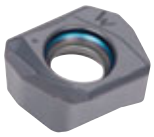


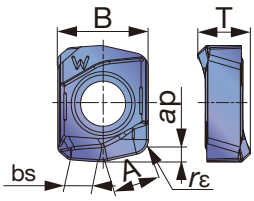
LNMU06-ML





LNGU06-W (2 cutting edges)





P	Steel				★	☆
M	Stainless				★	
K	Cast iron	★				☆
N	Non-ferrous					
S	Superalloys		★	☆		☆
H	Hard materials			☆	☆	★

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	AH130	AH725	AH3035	AH8015	A	B	T	bs
LNMU06X5ZER-MJ	2	1.5	●	●	●	●	●	6	12	7	-
LNMU06X5ZER-ML	2	1.5	●	●	●	●	●	6	12	7	-
LNGU06X5ZER-W	2	1.5			●			6	12	7	3.6

●: Line up

Reference pages

Standard cutting conditions → **D014 - D015**

STANDARD CUTTING CONDITIONS TXN06 / EXN06

ISO	Work material	Hardness	Priority	Grades	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t) Tool dia: *øDc* (mm) ø32 ~ ø200	Feed when plunging *fz* (mm/t)	ø32, z = 2 *n*	ø32, z = 2 *Vf*	ø35, z = 2 *n*	ø35, z = 2 *Vf*	ø40, z = 3 *n*	ø40, z = 3 *Vf*
P	Carbon steels (C45, C55 etc.)	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
			for wear resistance	AH8015	MJ									
	Alloy steels (42CrMo4, 17Cr3 etc.)	~ 300HB	First choice	AH3035	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
			for wear resistance	AH8015	MJ									
	Prehardened steels (NAK80, PX5 etc.)	30 ~ 40HRC	First choice	AH3035	ML	100 - 200	0.5 - 1.0	0.15	1,490	2,380	1,360	2,180	1,190	2,860
		30 ~ 40HRC	for impact resistance	AH3035	MJ	100 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
		30 ~ 40HRC	for wear resistance	AH8015	ML	100 - 200	0.5 - 1.0	0.15	1,490	2,380	1,360	2,180	1,190	2,860
M	Stainless steels (X5CrNi18-10, X5CrNiMo17-12-2 etc.)	~ 200HB	First choice	AH3035	ML	100 - 150	0.3 - 0.7	0.1	1,190	1,190	1,090	1,090	950	1,430
		~ 200HB	for impact resistance	AH3035	MJ	100 - 150	0.3 - 0.8	0.1	1,190	1,430	1,090	1,310	950	1,710
K	Gray cast irons (GG25, GG30 etc.)	150 ~ 250HB	First choice	AH120	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
		150 ~ 250HB	for wear resistance	AH8015	MJ	100 - 300	0.5 - 1.5	0.15	1,990	3,980	1,820	3,640	1,590	4,770
	Ductile cast irons (GGG40 etc.)	150 ~ 250HB	First choice	AH120	MJ	80 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
		150 ~ 250HB	for wear resistance	AH8015	MJ	80 - 200	0.5 - 1.5	0.15	1,490	2,980	1,360	2,720	1,190	3,570
S	Titanium alloy (Ti-6Al-4V etc.)	~ 40HRC	First choice	AH130	ML	30 - 60	0.3 - 0.7	0.08	400	400	360	360	320	480
			for impact resistance	AH130	MJ									
	Heat-resistance alloy (Inconel, Hasteroy etc.)	~ 40HRC	First choice	AH725	ML	20 - 50	0.1 - 0.3	0.05	300	120	270	110	240	140
			for wear resistance	AH8015	ML									
H	Hot mold steel (X40CrMoV5-1 etc.)	40 ~ 50HRC	First choice	AH8015	MJ	80 - 150	0.1 - 0.5	0.05	1,190	710	1,090	650	950	850
		40 ~ 50HRC	for impact resistance	AH3035	MJ	80 - 150	0.1 - 0.3	0.05	1,190	470	1,090	430	950	560
	Cold mold steel (X153CrMoV12 etc.)	50 ~ 60HRC	First choice	AH8015	MJ	50 - 70	0.05 - 0.2	0.03	600	120	550	110	480	140
		50 ~ 60HRC	for impact resistance	AH725	MJ	50 - 70	0.03 - 0.07	0.03	600	60	550	55	480	70

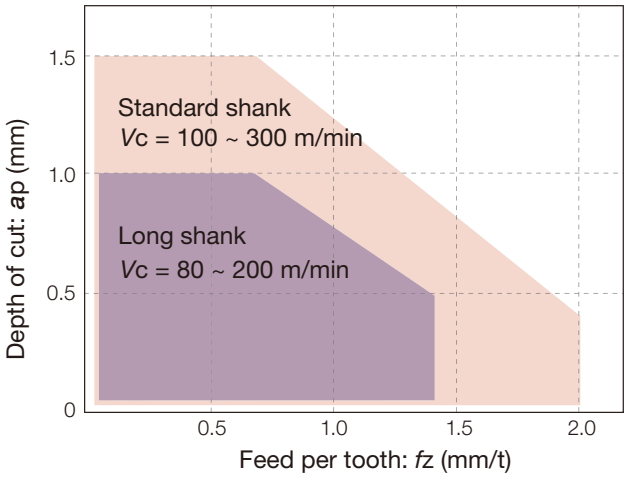
When chips stay in the cutting zone during slotting or pocketing, use air blast to remove chips from the work area.

Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.

CAUTIONARY POINTS IN USE

The usage of a standard & long shank

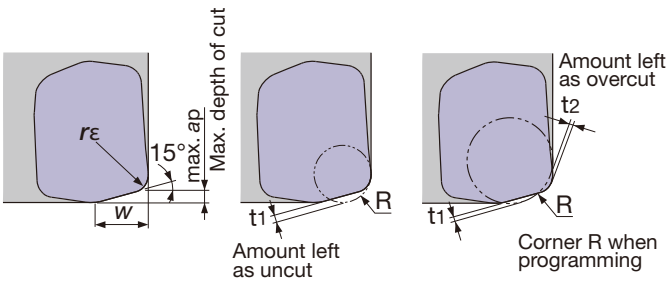
When using a long shank, please lower the cutting conditions (*Vc*, *fz*, *ap*) to 70% of the maximum conditions for the standard shank.



Tool dia.: *øDc* = ø32 ~ 40 mm
Workpiece material: C55 (200HB)
L/D ratio of overhang
Standard shank: L/D ≤ 3
Long shank: L/D = 4

Tool geometry for programming

When programming for CAM, the tool should be considered as a radius cutters. Usually, the corner radius should be set as R = 3 mm. If a larger radius is used, overcutting will occur. The following table shows the amount left as uncut (t_1) and overcut (t_2).



Max. depth of cut max. ap(mm)	Corner radius *r*ε	*W* (mm)	Corner R when programming	Amount left as uncut t_1	Amount left as overcut t_2
1.5	2	6	2	1	-
			3	0.77	-
			4	0.54	0.26

Each value in table is calculated theoretically at the maximum condition.

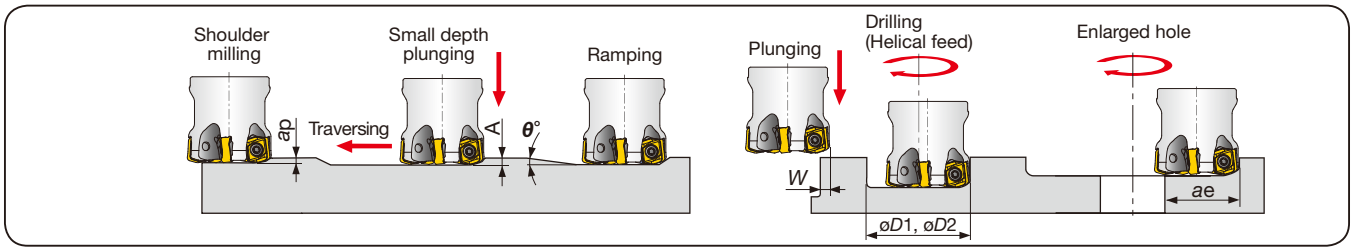
Tool dia:øDc (mm), Number of revolution: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Max. depth of cut:*ap* = 1.5 mm, Number of teeth:z

ø50			ø63			ø80			ø100, z = 6		ø125, z = 8		ø160, z = 10		ø200, z = 12	
n	*Vf*		*n*	*Vf*		*n*	*Vf*		*n*	*Vf*	*n*	*Vf*	*n*	*Vf*	*n*	*Vf*
	z = 4	z = 5		z = 4	z = 6		z = 5	z = 8								
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
Vc = 200 m/min, *fz* = 1 mm/t																
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
Vc = 200 m/min, *fz* = 1 mm/t																
950	3,040	3,800	760	2,430	3,650	600	2,400	3,840	480	2,290	380	2,450	300	2,390	240	2,290
Vc = 150 m/min, *fz* = 0.8 mm/t																
950	3,800	4,750	760	3,040	4,560	600	3,000	4,800	480	2,880	380	3,040	300	3,000	240	2,880
Vc = 150 m/min, *fz* = 1.0 mm/t																
950	3,040	3,800	760	2,430	3,650	600	2,400	3,840	480	2,290	380	2,450	300	2,390	240	2,290
Vc = 150 m/min, *fz* = 0.8 mm/t																
760	1,520	1,900	610	1,220	1,830	480	1,200	1,920	380	1,150	310	1,220	240	1,190	190	1,150
Vc = 120 m/min, *fz* = 0.5 mm/t																
760	1,820	2,280	610	1,470	2,200	480	1,440	2,300	380	1,380	310	1,470	240	1,430	190	1,380
Vc = 120 m/min, *fz* = 0.6 mm/t																
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
Vc = 200 m/min, *fz* = 1 mm/t																
1,270	5,080	6,350	1,010	4,040	6,060	800	4,000	6,400	640	3,820	510	4,080	400	3,980	320	3,820
Vc = 200 m/min, *fz* = 1 mm/t																
950	3,800	4,750	760	3,040	4,560	600	3,000	4,800	480	2,870	380	3,060	300	2,990	240	2,870
Vc = 150 m/min, *fz* = 1 mm/t																
950	3,800	4,750	760	3,040	4,560	600	3,000	4,800	480	2,870	380	3,060	300	2,990	240	2,870
Vc = 150 m/min, *fz* = 1 mm/t																
250	500	630	200	400	600	160	400	640	130	380	100	410	80	400	60	380
Vc = 40 m/min, *fz* = 0.5 mm/t																
190	150	190	150	120	180	120	120	190	100	120	80	120	60	120	50	120
Vc = 30 m/min, *fz* = 0.2 mm/t																
760	910	1,140	610	730	1,100	480	720	1,150	380	680	310	740	240	720	190	680
Vc = 120 m/min, *fz* = 0.3 mm/t																
760	600	760	610	490	730	480	480	760	380	450	310	490	240	480	190	450
Vc = 120 m/min, *fz* = 0.2 mm/t																
380	150	190	300	120	180	240	120	190	190	110	150	120	120	120	100	120
Vc = 60 m/min, *fz* = 0.1 mm/t																
380	75	95	300	60	90	240	60	95	190	55	150	60	120	60	100	60
Vc = 60 m/min, *fz* = 0.05 mm/t																

The above table shows the conditions for standard shank type cutters. When using long shank type cutters, the number of teeth may be different. In this case, the cutting conditions should be changed by referring to: "The usage of standard and long shanks" shown in previous page.

Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

APPLICATION RANGE

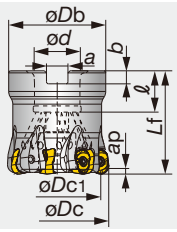


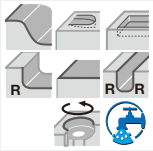
Designation	Tool dia. øDc	Max. depth of cut Max. ap	Max. ramping angle θ°	Max. plunging depth A	Max. cutting width in plunging W	Min.machinable hole dia. øD1	Max.machinable hole dia. øD2	Max. cutting width in enlarged hole ae
EXN06R032M...	ø32	1.5	2	0.5	6	47	59	25
EXN06R035M...	ø35	1.5	1.7	0.5	6	53	65	28
EXN06R040M...	ø40	1.5	1.3	0.5	6	63	75	33
TXN06R050M...	ø50	1.5	0.9	0.5	6	83	95	43
TXN06R052M...	ø52	1.5	0.8	0.5	6	87	99	45
TXN06R063M...	ø63	1.5	0.6	0.5	6	109	121	56
TXN06R066M...	ø66	1.5	0.5	0.5	6	115	127	59
TXN06R080M...	ø80	1.5	0.5	0.5	6	143	155	73
TXN06R100M...	ø100	1.5	0.34	0.5	6	183	195	93
TXN06R125M...	ø120	1.5	0.26	0.5	6	223	235	108
TXN06R160M...	ø160	1.5	0.2	0.5	6	303	315	153
TXN06R200M...	ø200	1.5	0.15	0.5	6	383	395	193

· For ø*Dc* above 100 mm, slot milling, ramping or contouring is not recommended as chips may be re-cut.

DOTWISTBALL
TXLN
Radius cutter with double-sided insert with 4 edges

A.R. = +3°, R.R. = -13°





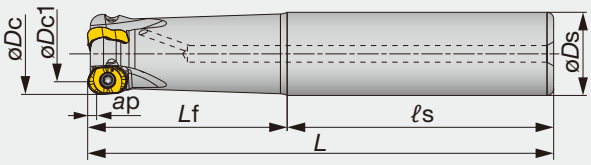
Designation	Max. ap	øDc	z	øDc1	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TXLN04M040B16.0R06	4	40	6	32	35	40	16	18	8.4	5.6	0.35	with	LNMX04...
TXLN04M050B22.0R07	4	50	7	42	47	50	22	20	10.4	6.3	0.45	with	LNMX04...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Torx bit
TXLN04M040B16.0R06	CSPD-3	SW6-SD	M-1000	FSHM8-30H	BLD IP10/S7
TXLN04M050B22.0R07	CSPD-3	SW6-SD	M-1000	CM10X30H	BLD IP10/S7

DOTWISTBALL
EXLN
Radius cutter with double-sided insert with 4 edges

A.R. = +3°, R.R. = -12° ~ -14°



Designation	Max. ap	øDc	z	øDc1	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EXLN04M020C20.0R02	4	20	2	12	20	80	50	130	0.28	with	LNMX04...
EXLN04M025C25.0R03	4	25	3	17	25	80	60	140	0.46	with	LNMX04...
EXLN04M032C32.0R04	4	32	4	24	32	80	70	150	0.83	with	LNMX04...
EXLN04M032C32.0R05	4	32	5	24	32	80	70	150	0.83	with	LNMX04...

SPARE PARTS

Designation	Clamping screw	Mono block type wrench
EXLN04...	CSPD-3	IP-10D

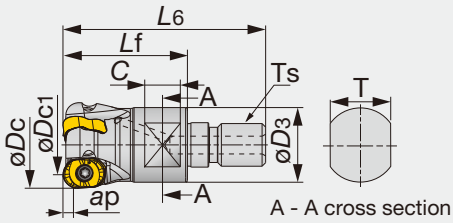
Reference pages

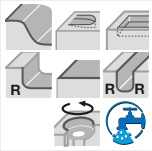
Inserts → **D017**, Standard cutting conditions → **D018**

HXLN04-M

Radius cutter with double-sided insert with 4 edges, Modular head with metric thread connection

A.R. = +3°, R.R. = -12° ~ -14°





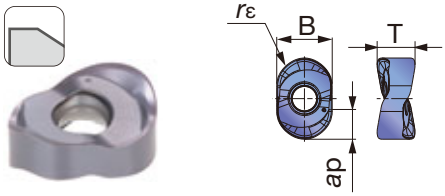
Designation	Max. ap	øDc	z	øDc1	L6	Lf	C	T	øD3	Ts	Kg	Air hole	Insert
HXLN04M020M10R02	4	20	2	12	49	30	10	15	18	M10	0.07	with	LNMX04...
HXLN04M025M12R03	4	25	3	17	57	35	10	17	21	M12	0.16	with	LNMX04...
HXLN04M032M16R04	4	32	4	24	63	40	12	22	29	M16	0.2	with	LNMX04...

SPARE PARTS

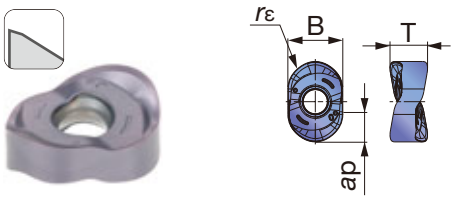
Designation	Clamping screw	Lubricant	Wrench
HXLN04...	CSPD-3	M-1000	IP-10D

INSERT

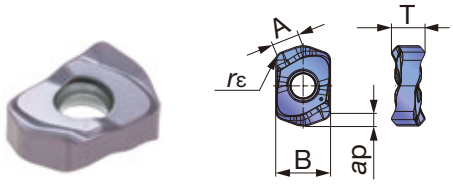
LNMX-MJ



LNMX-ML



LNMX-HJ



P	Steel	☆	★
M	Stainless		★
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys	★	☆
H	Hard materials	★	★

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	Coated AH3135	A	B	T
LNMX0405R4-MJ	4	4	●	●	-	8.2	5.6
LNMX0405R4-ML	4	4	●	●	-	8.2	5.6
LNMX0405ZER-HJ	1.3	1.3	●	●	4.3	8.2	5

●: Line up

Reference pages

Standard cutting conditions → **D018**

STANDARD CUTTING CONDITIONS

For MJ, ML type (Radius insert)

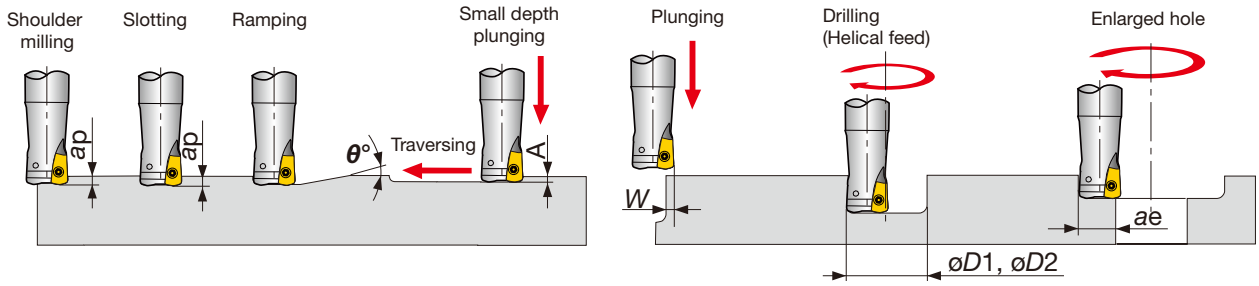
ISO	Workpiece material		Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels C15, C20, etc.		- 300 HB	First choice	AH3135	MJ	150 - 250	0.2 - 0.6
			- 300 HB	Second choice	AH3135	ML	150 - 250	0.2 - 0.6
	Carbon steels, Alloy steels C55, 42CrMoS4, etc.		- 300 HB	First choice	AH3135	MJ	150 - 250	0.2 - 0.6
			- 300 HB	Second choice	AH3135	ML	150 - 250	0.2 - 0.6
	Prehardened steels NAK80, PX5, etc.		30 - 40 HRC	First choice	AH3135	MJ	100 - 200	0.15 - 0.4
			30 - 40 HRC	Second choice	AH3135	ML	100 - 200	0.15 - 0.4
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200 HB	First choice	AH3135	MJ	100 - 200	0.2 - 0.6
			- 200 HB	Second choice	AH3135	ML	100 - 200	0.2 - 0.6
	Stainless steels X12Cr13, X20Cr13, etc.		- 200 HB	First choice	AH3135	MJ	100 - 300	0.2 - 0.6
			- 200 HB	Second choice	AH3135	ML	100 - 300	0.2 - 0.6
K	Grey cast irons 250, 300, etc.		150 - 250 HB	First choice	AH120	MJ	150 - 250	0.2 - 0.6
			150 - 250 HB	Second choice	AH120	ML	150 - 250	0.2 - 0.6
	Ductile cast irons 400-15, 600-3, etc.		150 - 250 HB	First choice	AH120	MJ	150 - 250	0.2 - 0.6
			150 - 250 HB	Second choice	AH120	ML	150 - 250	0.2 - 0.6
S	Titanium alloys Ti-6Al-4V, etc.		- 40 HRC	First choice	AH3135	ML	30 - 60	0.1 - 0.3
	Heat-resistant alloys Inconel 718, etc.		- 40 HRC	First choice	AH120	MJ	10 - 40	0.1 - 0.2
H	Hardened steel	X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	MJ	50 - 150	0.1 - 0.3
			40 - 50 HRC	Second choice	AH3135	ML	50 - 150	0.1 - 0.3
		X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	50 - 70	0.05 - 0.15
			50 - 60 HRC	Second choice	AH120	ML	50 - 70	0.05 - 0.15

For HJ type (High feed insert)

ISO	Workpiece material		Hardness	Priority	Grade	Chipbreaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels C15, C20, etc.		- 300 HB	First choice	AH3135	HJ	150 - 250	0.5 - 1.3
				Second choice	AH120	HJ	150 - 250	0.5 - 1.3
	Carbon steels, Alloy steels C55, 42CrMoS4, etc.		- 300 HB	First choice	AH3135	HJ	150 - 250	0.5 - 1.3
				Second choice	AH120	HJ	150 - 250	0.5 - 1.3
	Prehardened steels NAK80, PX5, etc.		30 - 40 HRC	First choice	AH3135	HJ	100 - 200	0.3 - 0.7
				Second choice	AH120	HJ	100 - 200	0.3 - 0.7
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200 HB	First choice	AH3135	HJ	100 - 200	0.3 - 0.7
			- 200 HB	First choice	AH3135	HJ	100 - 300	0.3 - 0.7
K	Grey cast irons 250, 300, etc.		150 - 250 HB	First choice	AH120	HJ	150 - 250	0.5 - 1.3
	Ductile cast irons 400-15, 600-3, etc.		150 - 250 HB	First choice	AH120	HJ	150 - 250	0.5 - 1.3
S	Titanium alloys Ti-6Al-4V, etc.		- 40 HRC	First choice	AH3135	HJ	30 - 60	0.3 - 0.7
	Heat-resistant alloys Inconel 718, etc.		- 40 HRC	First choice	AH120	HJ	10 - 40	0.1 - 0.3
H	Hardened steel	X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	HJ	50 - 150	0.1 - 0.5
				Second choice	AH120	HJ	50 - 150	0.1 - 0.5
		X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	HJ	50 - 70	0.05 - 0.2

Note: Recommended cutting conditions are just for reference in general machining.

APPLICATION RANGE



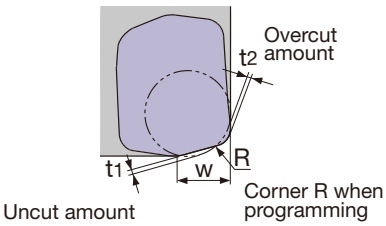
For MJ, ML type

Designation	Tool dia. øDc	øDc1	Max. depth of cut ap	Max. ramping angle θ°	Max. plunging depth A	Max. cutting width in plunging W	Min. machining øD1	Max. machining øD2	Max. cutting width in enlarging ae
EXLN04M020C20.0R02	20	12	4	4.7	0.8	4	28	38	15
EXLN04M025C25.0R03	25	17	4	3	0.8	4	38	48	20
EXLN04M032C32.0R04	32	24	4	2	0.8	4	50	62	27
EXLN04M032C32.0R05	32	24	4	1.7	0.7	4	50	62	27
TXLN04M040B16.0R06	40	32	4	1.3	0.7	4	68	78	36
TXLN04M050B22.0R07	50	42	4	1	0.7	4	88	98	46
HXLN04M020M10R02	20	12	4	4.7	0.8	4	28	38	15
HXLN04M025M12R03	25	17	4	3	0.8	4	38	48	20
HXLN04M032M16R04	32	24	4	2	0.8	4	50	62	27

For HJ type

Designation	Tool dia. øDc	øDc1	Max. depth of cut ap	Max. ramping angle θ°	Max. plunging depth A	Max. cutting width in plunging W	Min. machining øD1	Max. machining øD2	Max. cutting width in enlarging ae
EXLN04M020C20.0R02	20	12	1.3	4.9	0.75	4.1	27	38	15.5
EXLN04M025C25.0R03	25	17	1.3	3	0.75	4.1	37	48	20.5
EXLN04M032C32.0R04	32	24	1.3	2	0.75	4.1	51	62	27.5
EXLN04M032C32.0R05	32	24	1.3	2	0.75	4.1	51	62	27.5
TXLN04M040B16.0R06	40	32	1.3	1.4	0.75	4.1	67	78	35.5
TXLN04M050B22.0R07	50	42	1.3	1	0.75	4.1	87	98	45.5
HXLN04M020M10R02	20	12	1.3	4.9	0.75	4.1	27	38	15.5
HXLN04M025M12R03	25	17	1.3	3	0.75	4.1	37	48	20.5
HXLN04M032M16R04	32	24	1.3	2	0.75	4.1	51	62	27.5

TOOL GEOMETRY FOR PROGRAMMING



Max. depth of cut max. ap (mm)	W (mm)	Programmed corner R (mm)	Amount left uncut t1 (mm)	Amount left overcut t2 (mm)
1.3	4.1	R1.5	0.8	0
1.3	4.1	R2.0	0.65	0
1.3	4.1	R2.5	0.5	0.05
1.3	4.1	R3.0	0.36	0.2

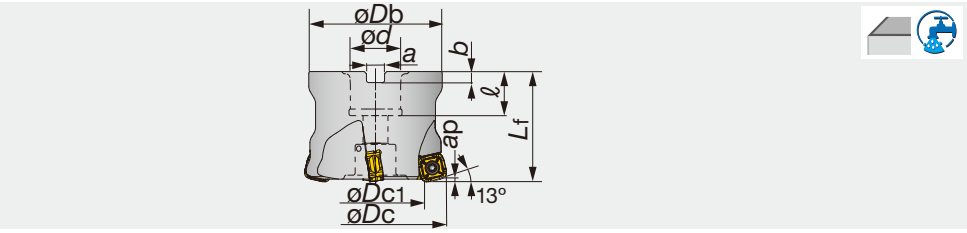
MEMO

DOFEEDQUAD

TXQ

High feed cutter for face milling

A.R. = +7°, R.R. = -8° ~ -4.5°



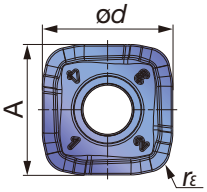
Designation	Max. ap	øDc	z	øDc1	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TXQ12R050M22.0E03	2	50	3	33.8	47	50	22	20	10.4	6.3	0.4	with	SQMU1206ZSR-MJ
TXQ12R052M22.0E03	2	52	3	35.8	49	50	22	20	10.4	6.3	0.5	with	SQMU1206ZSR-MJ
TXQ12R063M22.0E04	2	63	4	46.8	59	50	22	20	10.4	6.3	0.8	with	SQMU1206ZSR-MJ
TXQ12R066M27.0E04	2	66	4	49.8	63	50	27	22	12.4	7	0.9	with	SQMU1206ZSR-MJ
TXQ12R080M27.0E05	2	80	5	63.8	76	63	27	22	12.4	7	1.6	with	SQMU1206ZSR-MJ
TXQ12R100M32.0E06	2	100	6	83.8	96	63	32	25	14.4	8	3	with	SQMU1206ZSR-MJ
TXQ12R125M40.0E07	2	125	7	108.8	98	63	40	32	16.4	9	3.2	with	SQMU1206ZSR-MJ

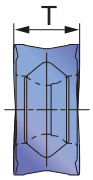
SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Center bolt 1	Torx bit
TXQ12R050, 052M22.0...	CSPB-4	H-TBS	M-1000	-	FSHM10-40H	BLDIP15/S7
TXQ12R063M22.0E04	CSPB-4	H-TBS	M-1000	-	CM10X30H	BLDIP15/S7
TXQ12R066, 080M27.0...	CSPB-4	H-TBS	M-1000	-	CM12X30H	BLDIP15/S7
TXQ12R100M32.0E06	CSPB-4	H-TBS	M-1000	-	CM16X40H	BLDIP15/S7
TXQ12R125M40.0E07	CSPB-4	H-TBS	M-1000	TMBA-M20H	-	BLDIP15/S7

INSERT

SQMU-MJ





P	Steel	☆		★	☆	
M	Stainless		★	☆		
K	Cast iron	★		☆		
N	Non-ferrous					
S	Superalloys	★	☆	★		
H	Hard materials			★		

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	AH130	AH725	T3130	A	T	ød
SQMU1206ZSR-MJ	2	2	●	●	●	●	11.7	6	11.7

●: Line up

Reference pages

Standard cutting conditions → **D022 - D023**

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	High carbon steels C45, etc.	~ 300HB	First choice	AH725	100 - 300	0.5 - 2
			For wear resistance	T3130	100 - 300	0.5 - 2
			For impact resistance	AH130	100 - 300	0.5 - 2
	Alloyed steels 42CrMo4, etc.	~ 300HB	First choice	AH725	100 - 200	0.5 - 1.5
			For wear resistance	T3130	100 - 200	0.5 - 1.5
			For impact resistance	AH130	100 - 200	0.5 - 1.5
	Prehardened steels PX5, NAK80, etc.	30 ~ 40HRC	-	AH725	100 - 200	0.5 - 1
M	Stainless steel X5CrNi18-9, etc.	~ 200HB	-	AH130	100 - 150	0.3 - 0.8
K	Grey cast iron 250, etc.	-	-	AH120	100 - 300	0.5 - 2
	Ductile cast irons 600-3, etc.	-	-	AH120	80 - 200	0.5 - 2
S	Titanium alloy Ti-6Al-4V, etc.	~ 40HRC	-	AH725	30 - 60	0.3 - 0.7
H	Hardened steels X40CrMoV5-1, etc.	40 ~ 50HRC	-	AH725	80 - 130	0.1 - 0.3
		50 ~ 60HRC	-	AH725	50 - 70	0.03 - 0.07

· Slot or pocket milling is not recommended, since chip re-cutting easily occurs.
· Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.

· Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

Tool dia.: ø*Dc* (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Max. depth of cut: *ap* = 2 mm

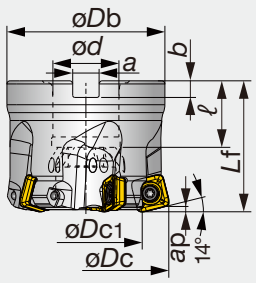
ø50		ø63		ø80		ø100		ø125	
n	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***	***n***	***Vf***
1,270	4,570	1,010	4,850	790	4,740	630	4,540	500	4,200
Vc = 200 m/min, *fz* = 1.2 mm/t									
950	2,850	750	3,000	590	2,950	470	2,820	380	2,660
Vc = 150 m/min, *fz* = 1.0 mm/t									
950	2,280	750	2,400	590	2,360	470	2,260	380	2,130
Vc = 150 m/min, *fz* = 0.8 mm/t									
760	1,140	600	1,200	470	1,180	380	1,140	300	1,050
Vc = 120 m/min, *fz* = 0.5 mm/t									
1,270	4,570	1,010	4,850	790	4,740	630	4,540	500	4,200
Vc = 200 m/min, *fz* = 1.2 mm/t									
950	3,420	750	3,600	590	3,540	470	3,380	380	3,190
Vc = 150 m/min, *fz* = 1.2 mm/t									
250	370	200	400	150	380	120	360	100	350
Vc = 40 m/min, *fz* = 0.5 mm/t									
630	380	500	400	390	390	310	370	250	350
Vc = 100 m/min, *fz* = 0.2 mm/t									
380	60	300	60	235	60	190	60	150	50
Vc = 60 m/min, *fz* = 0.05 mm/t									

MILLQFEED UAD

TXSW

Super high-feed miling cutter with large depth of cut; Bore type

A.R. = +5°, R.R. = 0°



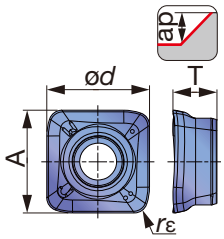
Designation	Max. ap	øDc	z	øDc1	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TXSW15M050B22.0R03	2.5	50	3	24.1	47	50	22	20	10.4	6.3	0.4	with	SWMT15...
TXSW15M063B22.0R04	2.5	63	4	37.1	59	50	22	20	10.4	6.3	0.66	with	SWMT15...
TXSW15M080B27.0R05	2.5	80	5	54.1	76	63	27	22	12.4	7	1.41	with	SWMT15...
TXSW15M100B32.0R06	2.5	100	6	74.1	96	63	32	25	14.4	8	2.26	with	SWMT15...
TXSW15M125B40.0R07	2.5	125	7	99.1	100	63	40	37	16.4	9	2.83	with	SWMT15...
TXSW15M160B40.0R08	2.5	160	8	134.1	100	63	40	37	16.4	9	4.23	with	SWMT15...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Center bolt 1	Center bolt 2	Torx bit
TXSW15M050B22.0R03	TS50115I	H-TB2W	M-1000	-	-	SR PS 118-0273	BT20S
TXSW15M063B22.0R04	TS50115I	H-TB2W	M-1000	-	FSHM10-40H	-	BT20S
TXSW15M080B27.0R05	TS50115I	H-TB2W	M-1000	-	CM12X30H	-	BT20S
TXSW15M100B32.0R06	TS50115I	H-TB2W	M-1000	-	CM16X40H	-	BT20S
TXSW15M125B40.0R07	TS50115I	H-TB2W	M-1000	TMBA-M20H	-	-	BT20M
TXSW15M160B40.0R08	TS50115I	H-TB2W	M-1000	TMBA-M20H	-	-	BT20M

INSERT

SWMT-MJ



P	Steel	☆	★
M	Stainless		★
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys	★	☆
H	Hard materials	★	★

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	Coated AH3135	A	ød	T
SWMT1506ZER-MJ	2	2.5	●	●	15.9	15.9	6.8

●: Line up

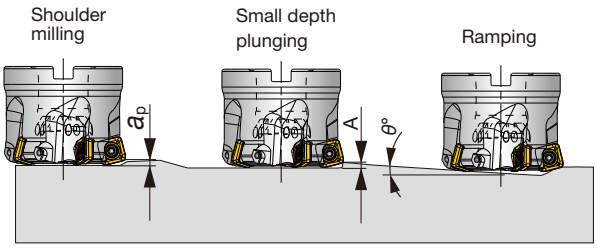
Reference pages

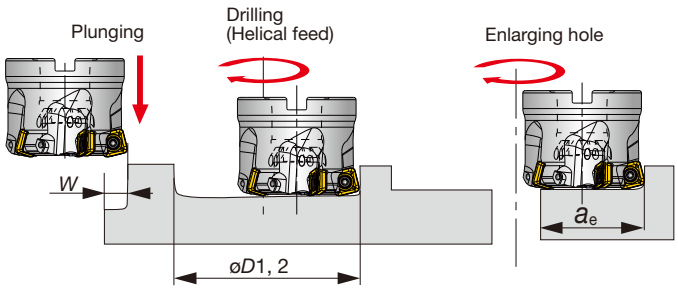
Standard cutting conditions → **D025**

STANDARD CUTTING CONDITIONS

ISO	Workpiece material		Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel C15E4, E275A, etc.		- 300 HB	First choice	AH3135	MJ	100 - 300	0.5 - 2
			- 300 HB	Second choice	AH120	MJ	100 - 300	0.5 - 2
	Carbon steel and alloy steel C55, 42CrMo4, etc.		- 300 HB	First choice	AH3135	MJ	100 - 200	0.5 - 2
			- 300 HB	Second choice	AH120	MJ	100 - 200	0.5 - 2
	Prehardened steel NAK80, PX5, etc.		30 - 40 HRC	First choice	AH3135	MJ	100 - 200	0.5 - 1.5
			30 - 40 HRC	Second choice	AH120	MJ	100 - 200	0.5 - 1.5
M	Stainless steel X5CrNi18-9, X5CrNiMo17-12-3, etc.		- 200 HB	First choice	AH3135	MJ	100 - 150	0.3 - 1
K	Grey cast iron 250, 300, etc.		150 -250 HB	First choice	AH120	MJ	100 - 300	0.5 - 2
	Ductile cast iron 600-3, etc.		150 -250 HB	First choice	AH120	MJ	80 - 200	0.5 - 2
S	Titanium alloys Ti-6Al-4V, etc.		- 40 HRC	First choice	AH3135	MJ	30 - 60	0.3 - 0.7
	Superalloys Inconel718, etc.		- 40 HRC	First choice	AH120	MJ	20 - 50	0.1 - 0.3
H	Hardened steel	X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	MJ	80 - 130	0.1 - 0.3
		X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	50 - 70	0.03 - 0.07

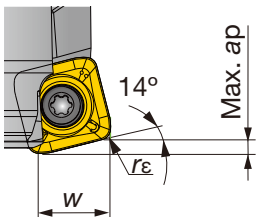
APPLICATION RANGE

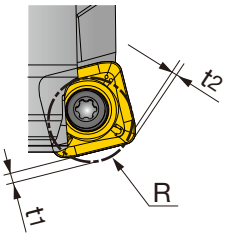




Designation	Tool dia. øDc	Max. depth of cut ap	Max. plunging depth A	Max. ramping angle θ°	Max. cutting width in plunging W	Min. machining dia. øD1	Max. machining dia. øD2	Max. cutting width in enlarging ae
TXSW15M050B***	50	2.5	0.7	4.8	15	70	95	36
TXSW15M063B***	63	2.5	0.7	2.9	15	96	121	49
TXSW15M080B***	80	2.5	0.7	2	15	130	155	66
TXSW15M100B***	100	2.5	0.7	1.4	15	170	195	86
TXSW15M125B***	125	2.5	0.7	1	15	220	245	111
TXSW15M160B***	160	2.5	0.7	0.7	15	290	315	146

TOOL GEOMETRY FOR PROGRAMMING





Max. ap (mm)	Actual corner radius rε (mm)	W (mm)	Programmed corner radius R (mm)	Uncut amount t1 (mm)	Overcut amount t2 (mm)
2.5	2	12.7	4	1.99	-
2.5	2	12.7	4.5	1.88	-
2.5	2	12.7	5	1.78	0.01

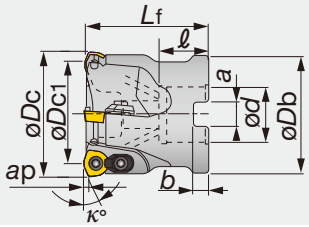
- When programming for CAM, the tool should be considered as a radius cutter. Usually, the corner radius should be set in R = 4.5 mm.
If a larger radius is used, overcutting may occur. The above table shows the uncut (t1) and overcut (t2) amounts for the programmed corner radius.

MILLFEED

TXP05/06/08/09

Super high feed milling cutter

A.R. = +5°, R.R. = -4° ~ -6°



Designation	Max. *ap*	ø*Dc*	z	ø*Dc*1	ø*Db*	*Lf*	ø*d*	*ℓ*	*a*	*b*	*κ*°	Kg	Air hole	Insert
TXP05063RB-E	1.5	63	6	55.4	59	50	22	20	10.4	6.3	15	0.8	with	WPM*05...
TXP05080RB-E	1.5	80	7	72.4	76	63	27	22	12.4	7	15	1.7	with	WPM*05...
TXP06063RB-E	1.5	63	5	54.4	59	50	22	20	10.4	6.3	20	0.7	with	WPM*06...
TXP06080RB-E	1.5	80	6	71.4	76	63	27	22	12.4	7	20	1.6	with	WPM*06...
TXP08050R-E	1.5	50	3	38.6	47	50	22	20	10.4	6.3	10	0.4	without	WPMT08...
TXP08052R-E	1.5	52	3	40.6	50	50	22	20	10.4	6.3	10	0.5	without	WPMT08...
TXP08063R-E	1.5	63	4	51.6	59	50	22	20	10.4	6.3	10	0.7	without	WPMT08...
TXP08066R-E	1.5	66	4	54.6	63	50	27	22	12.4	7	10	0.8	without	WPMT08...
TXP08080R-E	1.5	80	5	68.6	76	63	27	22	12.4	7	10	1.5	without	WPMT08...
TXP08100R-E	1.5	100	6	88.6	96	63	32	25	14.4	8	10	2.5	without	WPMT08...
TXP09063R-E	3	63	3	49.4	59	50	22	20	10.4	6.3	20	0.6	without	WPMT09...
TXP09080R-E	3	80	4	66.4	76	63	27	22	12.4	7	20	1.3	without	WPMT09...
TXP09100R-E	3	100	5	86.4	96	63	32	25	14.4	8	20	2.4	without	WPMT09...
TXP09125R-E	3	125	6	111.4	98	63	40	32	16.4	9	20	2.9	without	WPMT09...

TXP05/06/08/09

SPARE PARTS

Designation	Clamp set	Clamping screw	Lubricant	Center bolt	Center bolt 1	Center bolt 2	Wrench	Wrench 1
TXP05063RB-E	CSY-15	CSPB-3.5S	M-1000	-	CM10X30H	-	IP-15D	-
TXP05080RB-E	CSY-15	CSPB-3.5S	M-1000	-	-	CAP-CM12X1.75X30	IP-15D	-
TXP06063RB-E	CSY-15	CSPB-4S	M-1000	-	CM10X30H	-	IP-15D	-
TXP06080RB-E	CSY-15	CSPB-4S	M-1000	-	CM12X30H	-	IP-15D	-
TXP08050, 052R-E	CSX20	CSTB-5	M-1000	-	-	FSHM10-40	-	T-20T
TXP08063, 066R-E	CSX20	CSTB-5	M-1000	-	-	-	-	T-20T
TXP08080R-E	CSX20	CSTB-5	M-1000	-	-	-	-	T-20T
TXP08100R-E	CSX20	CSTB-5	M-1000	-	-	-	-	T-20T
TXP09063R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09080R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09100R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T
TXP09125R-E	CSY-20	CSPB-5	M-1000	-	-	-	-	IP-20T

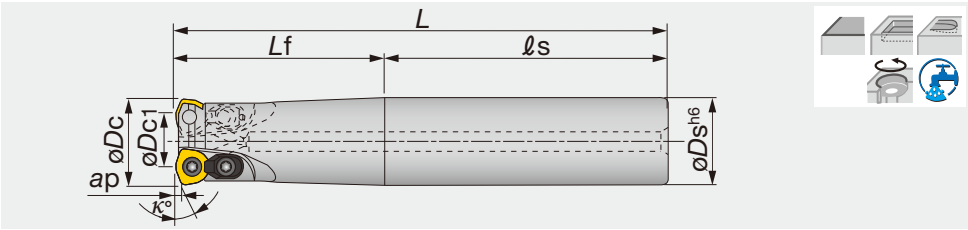
Reference pages

Inserts → **D028**, Standard cutting conditions → **D029 - D030**

EXP05/06/08/09

Super high feed endmill

A.R. = +5°, R.R. = -6°



Designation	Max. ap	øDc	z	øDc1	øDs	L	Lf	ℓs	κ°	Air hole	Insert	shank
EXP05020RL	1.5	20	2	12.4	20	180	100	80	15	with	WPM*05...	Cylindrical
EXP05020RLL	1.5	20	2	12.4	20	250	130	120	15	with	WPM*05...	Cylindrical
EXP05020RS	1.5	20	2	12.4	20	130	50	80	15	with	WPM*05...	Cylindrical
EXP05021RL	1.5	21	2	13.4	20	180	100	80	15	with	WPM*05...	Cylindrical
EXP05021RLL	1.5	21	2	13.4	20	250	50	200	15	with	WPM*05...	Cylindrical
EXP05021RS	1.5	21	2	13.4	20	130	50	80	15	with	WPM*05...	Cylindrical
EXP06025RL	1.5	25	2	16.4	25	200	120	80	20	with	WPM*06...	Cylindrical
EXP06025RLL	1.5	25	2	16.4	25	300	180	120	20	with	WPM*06...	Cylindrical
EXP06025RS	1.5	25	2	16.4	25	140	60	80	20	with	WPM*06...	Cylindrical
EXP06026RL	1.5	26	2	17.4	25	200	120	80	20	with	WPM*06...	Cylindrical
EXP06026RLL	1.5	26	2	17.4	25	300	60	240	20	with	WPM*06...	Cylindrical
EXP06026RS	1.5	26	2	17.4	25	140	60	80	20	with	WPM*06...	Cylindrical
EXP06032RL	1.5	32	2	23.4	32	200	120	80	20	with	WPM*06...	Cylindrical
EXP06032RLB	1.5	32	3	23.4	32	200	120	80	20	with	WPM*06...	Cylindrical
EXP06032RLL	1.5	32	2	23.4	32	300	180	120	20	with	WPM*06...	Cylindrical
EXP06032RS	1.5	32	2	23.4	32	150	70	80	20	with	WPM*06...	Cylindrical
EXP06032RSB	1.5	32	3	23.4	32	150	70	80	20	with	WPM*06...	Cylindrical
EXP06033RL	1.5	33	2	24.4	32	200	120	80	20	with	WPM*06...	Cylindrical
EXP06033RLB	1.5	33	3	24.4	32	200	120	80	20	with	WPM*06...	Cylindrical
EXP06033RLL	1.5	33	2	24.4	32	300	70	230	20	with	WPM*06...	Cylindrical
EXP06033RS	1.5	33	2	24.4	32	150	70	80	20	with	WPM*06...	Cylindrical
EXP06033RSB	1.5	33	3	24.4	32	150	70	80	20	with	WPM*06...	Cylindrical
EXP06040RL	1.5	40	3	31.4	32	250	50	200	20	with	WPM*06...	Cylindrical
EXP06040RLL	1.5	40	3	31.4	32	300	50	250	20	with	WPM*06...	Cylindrical
EXP06040RLS42	1.5	40	3	31.4	42	250	50	200	20	with	WPM*06...	Cylindrical
EXP06040RS	1.5	40	3	31.4	32	150	50	100	20	with	WPM*06...	Cylindrical
EXP08040RLA	1.5	40	2	28.6	32	250	50	200	10	with	WPMT08...	Cylindrical
EXP08040RLL	1.5	40	2	28.6	32	300	50	250	10	with	WPMT08...	Cylindrical
EXP08040RSA	1.5	40	2	28.6	32	150	50	100	10	with	WPMT08...	Cylindrical
EXP09050RS	3	50	2	36.4	42	150	50	100	20	with	WPMT09...	Cylindrical
EXP09050RL	3	50	2	36.4	42	250	50	200	20	with	WPMT09...	Cylindrical

SPARE PARTS

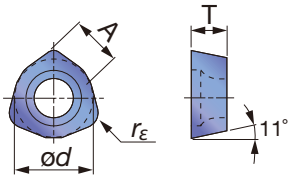
Designation	Clamp set	Clamping screw	Lubricant	Wrench	Wrench 1
EXP050...	-	CSPB-3.5S	M-1000	IP-15D	-
EXP060...	CSY-15	CSPB-4S	M-1000	IP-15D	-
EXP080...	CSX20	CSTB-5	M-1000	-	T-20T
EXP090...	CSY-20	CSPB-5	M-1000	-	IP-20T

Reference pages

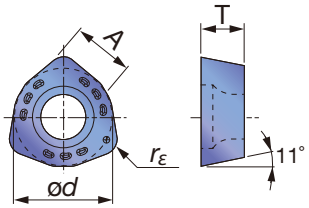
Inserts → **D028**, Standard cutting conditions → **D029 - D030**

INSERT

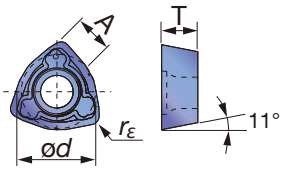
WPMW05/06



WPMT08/09



WPMT05/06/08/09-ML



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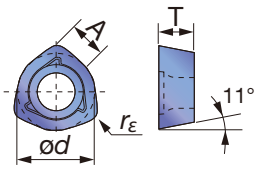
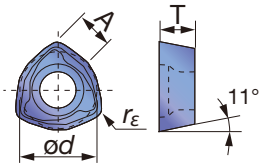


WPMT05/06/08/09-DML



P	Steel	★				★						
M	Stainless		★	★								
K	Cast iron	★										
N	Non-ferrous											
S	Superalloys	★	☆									
H	Hard materials				★							

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated																			A	ød	T
			AH120	AH130	AH140	AH730	T3130																	
WPMW05H315ZPR	1.5	1.5	●		●		●															5	7.94	3.5
WPMT05H315ZPR-ML	1.5	1.5	●		●		●															5	7.94	3.5
WPMT05H315ZPR-MH	1.5	1.5	●		●																	5	7.94	3.5
WPMT05H315ZPR-DML	1.5	1.5				●																5	7.94	3.5
WPMW06X415ZPR	1.5	1.5	●		●		●															6	9.525	4.2
WPMT06X415ZPR-ML	1.5	1.5	●	●	●		●															6	9.525	4.2
WPMT06X415ZPR-MH	1.5	1.5	●		●																	6	9.525	4.2
WPMT06X415ZPR-DML	1.5	1.5				●																6	9.525	4.2
WPMT080615ZSR	1.5	1.5	●	●	●		●															8	12.87	6.35
WPMT080615ZPR-ML	1.5	1.5	●	●	●		●															8	12.87	6.35
WPMT080615ZSR-MH	1.5	1.5	●		●																	8	12.87	6.35
WPMT080615ZPR-DML	1.5	1.5				●																8	12.87	6.35
WPMT090725ZSR	2.5	3	●		●		●															9	15	7
WPMT090725ZPR-ML	2.5	3	●	●	●		●															9	15	7
WPMT090725ZSR-MH	2.5	3	●	●	●																	9	15	7
WPMT090725ZPR-DML	2.5	3				●																9	15	7

●: Line up

STANDARD CUTTING CONDITIONS

05·06 type

ISO	Workpiece material	Insert grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	ø20, 21 (z = 2)	ø25, 26 (z = 2)	ø32, 33 (z = 2, 3)	ø40 (z = 3)	ø63 (z = 5, 6)	ø80 (z = 6, 7)
P	Carbon Steels C50, etc. < 300HB	AH120 (T3130)	100 ~ 250	0.5 ~ 2	*Vc* = 150 m/min, *fz* = 0.8 mm/t ap =1 mm, *ae* = 1D mm	*Vc* = 150 m/min, *fz* = 1 mm/t ap = 1 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.2 mm/t					
	Alloy steels 42CrMo4etc, etc. < 300 HB	AH120 (T3130)	100 ~ 200	0.5 ~ 2	*Vc* = 130 m/min, *fz* = 0.8 mm/t ap = 1 mm, *ae* = 1D mm	*Vc* = 130 m/min, *fz* = 1 mm/t ap = 1 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.2 mm/t					
	Prehardened steels NAK80, PX5, X96CrMoV12, etc. 30 ~ 40HRC	AH120 (T3130)	80 ~ 150	0.5 ~ 1	*Vc* = 100 m/min, *fz* = 0.5 mm/t ap = 1 mm, *ae* = 1D mm	*Vc* = 100 m/min, *fz* = 0.5 mm/t ap = 1 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.1 mm/t					
M	Stainless steels X5CrNi18 9, etc.	AH130 AH140	100 ~ 200	0.5 ~ 2	*Vc* = 130 m/min, *fz* = 0.8 mm/t ap = 1 mm, *ae* = 1D mm	*Vc* = 130 m/min, *fz* = 1 mm/t ap = 1 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.2 mm/t					
K	Cast irons 250, etc.	AH120	100 ~ 250	0.8 ~ 2.5	*Vc* = 150 m/min, *fz* = 1 mm/t ap = 1 mm, *ae* = 1D mm	*Vc* = 180 m/min, *fz* = 1.5 mm/t ap = 1 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.2 mm/t					
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.3 ~ 0.7	*Vc* = 50 m/min, *fz* = 0.5 mm/t, *ap* = 0.7 mm, *ae* = 0.5D mm					
					When plunging in small depth: *fz* = 0.1 mm/t					
	Heat-resistant alloys Inconel 718, etc.	AH120	10 ~ 40	0.1 ~ 0.3	*Vc* = 30 m/min, *fz* = 0.2 mm/t, *ap* = 0.7 mm, *ae* = 0.5D mm					
					When plunging in small depth: *fz* = 0.1 mm/t					
H	Hard materials X153CrMoV12, etc. 40 ~ 50HRC	AH730	50 ~ 80	0.5 ~ 1	*Vc* = 70 m/min, *fz* = 0.7 mm/t, *ap* = 0.7 mm, *ae* = 1D mm					
					When plunging in small depth: *fz* = 0.1 mm/t					

08 type

ISO	Workpiece material	Insert grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	ø40 (z = 2)	ø50 (z = 3)	ø63 (z = 4)	ø80 (z = 5)	ø100 (z = 6)
P	Carbon Steels C50, etc. < 300HB	AH120 (T3130)	100 ~ 250	0.5 ~ 2	*Vc* = 180 m/min, *fz* = 1 mm/t ap = 1 mm, *ae* = 40 mm	*Vc* = 200 m/min, *fz* = 1.5 mm/t ap = 1 mm, *ae* = 1D mm			
					When plunging in small depth: *fz* = 0.2 mm/t				
	Alloy steels 42CrMo4, etc. < 300 HB	AH120 (T3130)	100 ~ 200	0.5 ~ 2	*Vc* = 130 m/min, *fz* = 1 mm/t ap = 1 mm, *ae* = 40 mm	*Vc* = 150 m/min, *fz* = 1.5 mm/t ap = 1 mm, *ae* = 1D mm			
					When plunging in small depth: *fz* = 0.2 mm/t				
	Prehardened steels NAK80, PX5, X96CrMoV12, etc. 30 ~ 40HRC	AH120 (T3130)	80 ~ 150	0.5 ~ 1	*Vc* = 100 m/min, *fz* = 0.5 mm/t ap = 1 mm, *ae* = 40 mm	*Vc* = 120 m/min, *fz* = 0.8 mm/t ap = 1 mm, *ae* = 1D mm			
					When plunging in small depth: *fz* = 0.1 mm/t				
M	Stainless steels X5CrNi18 9, etc.	AH130 AH140	100 ~ 200	0.5 ~ 2	*Vc* = 130 m/min, *fz* = 1 mm/t ap = 1 mm, *ae* = 40 mm	*Vc* = 150 m/min, *fz* = 1.5 mm/t ap = 1 mm, *ae* = 1D mm			
					When plunging in small depth: *fz* = 0.2 mm/t				
K	Cast irons 250, etc.	AH120	150 ~ 250	0.8 ~ 2.5	*Vc* = 180 m/min, *fz* = 1.5 mm/t ap = 1 mm, *ae* = 40 mm	*Vc* = 200 m/min, *fz* = 2 mm/t ap = 1 mm, *ae* = 1D mm			
					When plunging in small depth: *fz* = 0.2 mm/t				
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.3 ~ 0.7	*Vc* = 50 m/min, *fz* = 0.5 mm/t, *ap* = 0.7 mm, *ae* = 0.5D mm				
					When plunging in small depth: *fz* = 0.1 mm/t				
	Heat-resistant alloys Inconel 718, etc.	AH120	10 ~ 40	0.1 ~ 0.3	*Vc* = 30 m/min, *fz* = 0.2 mm/t, *ap* = 0.7 mm, *ae* = 0.5D mm				
					When plunging in small depth: *fz* = 0.1 mm/t				
H	Hard materials X153CrMoV12, etc. 40 ~ 50HRC	AH730	50 ~ 80	0.5 ~ 1	*Vc* = 70 m/min, *fz* = 0.7 mm/t, *ap* = 0.7 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.1 mm/t				

Note: • The above values of cutting speed show the standard speed when overhang length of tool is below 3D. The cutting speed and the feed rate should be set at the lower limit values when overhang length of tool exceeds 3D.
• Thick and heavy chips are discharged by these TAC mills. Use internal air supply or air-blowing in order to prevent tool failure.

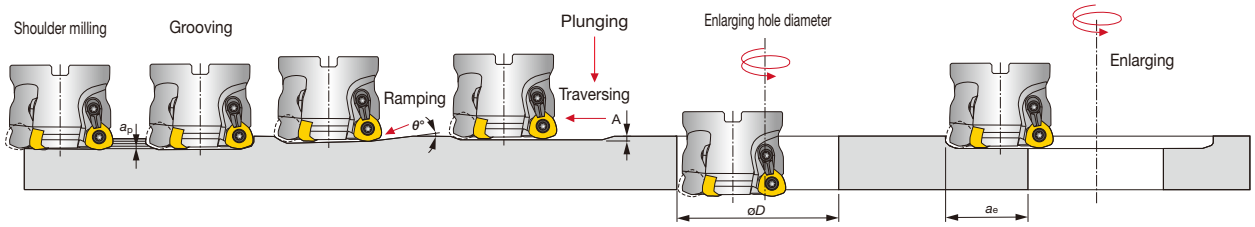
STANDARD CUTTING CONDITIONS

09 type

ISO	Workpiece material	Insert grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	ø50 (z = 2)	ø63 (z = 3)	ø80 (z = 4)	ø100 (z = 5)	ø125 (z = 6)
P	Carbon Steels C50, etc. < 300HB	AH120 (T3130)	100 ~ 250	0.5 ~ 2	*Vc* = 200 m/min, *fz* = 1.5 mm/t, *ap* = 2 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.2 mm/t				
	Alloy steels 42CrMo4etc, etc. < 300 HB	AH120 (T3130)	100 ~ 200	0.5 ~ 2	*Vc* = 150 m/min, *fz* = 1.5 mm/t, *ap* = 2 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.2 mm/t				
	Prehardened steels NAK80, PX5, X96CrMoV12, etc. 30 ~ 40HRC	AH120 (T3130)	80 ~ 150	0.5 ~ 1	*Vc* = 120 m/min, *fz* = 0.8 mm/t, *ap* = 2 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.1 mm/t				
M	Stainless steels X5CrNi18 9, etc.	AH130 AH140	100 ~ 200	0.5 ~ 2	*Vc* = 150 m/min, *fz* = 1.5 mm/t, *ap* = 2 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.2 mm/t				
K	Cast irons 250, etc.	AH120	150 ~ 250	0.8 ~ 2.5	*Vc* = 200 m/min, *fz* = 2 mm/t, *ap* = 2 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.2 mm/t				
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.3 ~ 0.7	*Vc* = 50 m/min, *fz* = 0.5 mm/t, *ap* = 1.5 mm, *ae* = 0.5D mm				
					When plunging in small depth: *fz* = 0.1 mm/t				
	Heat-resistant alloys Inconel 718, etc.	AH120	10 ~ 40	0.1 ~ 0.3	*Vc* = 30 m/min, *fz* = 0.2 mm/t, *ap* = 1 mm, *ae* = 0.5D mm				
					When plunging in small depth: *fz* = 0.1 mm/t				
H	Hard materials X153CrMoV12, etc. 40 ~ 50HRC	AH730	60 ~ 100	0.5 ~ 1	*Vc* = 70 m/min, *fz* = 0.7 mm/t, *ap* = 0.7 mm, *ae* = 1D mm				
					When plunging in small depth: *fz* = 0.1 mm/t				

Notes : The cutting speed and feed should be set to 70 to 80 % of the value shown in the above table when overhang length of tool exceeds 3D.

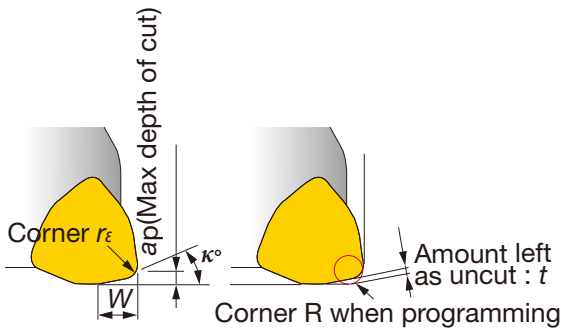
APPLICATION RANGE



Designation	øDc	Max. depth of cut ap	Max. ramping angle θ°	Max. plunging depth A	Min. machining hole dia. øD	Max. machining hole dia. øD	Max. cutting width in enlarging hole ae
EXP05020RS/L	20	1.5	3	0.5	30	37	16
EXP05021RS/L	21	1.5	2.5	0.5	32	39	17
TXP05063RB-E	63	1.5	1	0.5	116	123	59
TXP05080RB-E	80	1.5	0.5	0.5	150	157	76
E/HXP06025...	25	1.5	5	1	33	47	20
E/HXP06026...	26	1.5	4.5	1	35	49	21
E/HXP06032...	32	1.5	3.5	1	47	61	27
E/HXP06033...	33	1.5	3	1	49	63	28
E/HXP06040...	40	1.5	2	1	63	77	35
HXP06050R...	50	1.5	1.5	1	83	97	45
TXP06063RB-E	63	1.5	1	1	109	123	58
TXP06080RB-E	80	1.5	0.5	1	143	157	75
E/HXP08040R/L	40	1.5	6	1	53	77	34
T/HXP08050...	50	1.5	4	1	72	97	44
TXP08052R-E	52	1.5	4	1	76	101	46
TXP08063...	63	1.5	2.5	1	98	123	57
TXP08066R-E	66	1.5	2.5	1	104	129	60
TXP08080...	80	1.5	1.5	1	132	157	74
TXP08100...	100	1.5	1	1	172	197	94
EXP09050RS/L	50	3	1.5	0.8	76	97	43
HXP09050R...	50	3	1.5	0.8	76	97	43
TXP09063R...	63	3	2	1.5	98	123	56
TXP09080R...	80	3	1.5	1.5	132	157	73
TXP09100R...	100	3	1	1.5	172	197	93
TXP09125R...	125	3	0.75	1.5	222	247	118

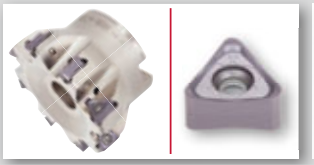
TOOL GEOMETRY FOR PROGRAMMING

When programming for CAD/CAM, the tool should be assumed to be a radius cutter shown in the table below. In this case, the amount left as uncut (t) is shown below.



TXP	Max. depth of cut ap	Corner of insert rε	Cutting edge angle κ°	W	t	Corner R when programming
05	1.5	1.5	15	3.8	0.5	R2
06	1.5	1.5	20	4.3	0.7	R2.5
08	1.5	1.5	10	5.7	0.7	R2
09	3	2.5	20	6.8	1.4	R3
09	3	2.5	20	6.8	1.2	R4

MillLine - Shoulder Milling



DOFORCE TRI
D034

Economical and versatile shoulder mills with double-sided triangular inserts

90° ø32 - ø125 mm
max. ap 11 mm

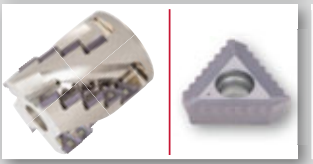
P M K S

TUNG-TRI
D038

High-precision shoulder mills with single-sided triangular inserts

90° ø12 - ø160 mm
max. ap 15 mm

P M K N S



TUNG TRI SHRED
D047

Square shoulder milling cutters for roughing to produce shredded chips

90° ø50 - ø100 mm
max. ap 16 mm

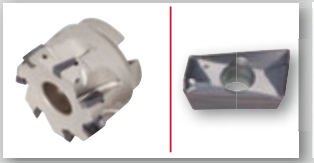
P M K S

TUNGFORCE REC
D050

Mini square shoulder milling cutters for high productivity

90° ø8 - ø16 mm
max. ap 6 mm

P M K N S H



TUNGREC
D054

Excellent surface finish and wall accuracy in shoulder milling

90° ø12 - ø160 mm
max. ap 16.7 mm

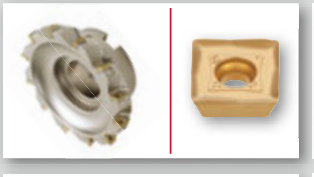
P M K N S

TUNGQUAD
D070

Ideal tool for milling small parts on small machines

90° ø12 - ø40 mm
max. ap 4 mm

P M K N

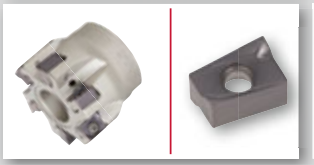


TUNGMILL
D074

Single-sided inserts with low cutting force for shoulder milling

90° ø50 - ø125 mm
max. ap 10 mm

P M K N

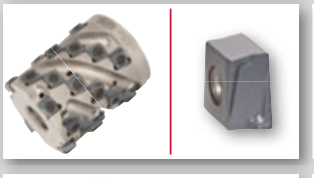


DOREC
D080

Shoulder milling cutters for general purpose with 4-cornered double-sided inserts

90° ø25 - ø160 mm
max. ap 16 mm

P M K S

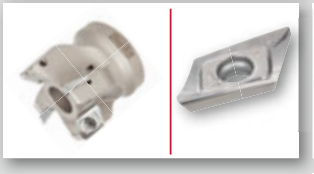


TECMILL
D083

Shoulder milling cutters for heavy duty with 4-cornered tangentially mounted inserts

90° ø32 - ø125 mm
max. ap 15.1 mm

P M K S



TUNG-ALUMILL
D086

Highly polished and positive routing cutters for aluminium and non-ferrous metals

90° ø25 - ø125 mm
max. ap 16 mm

N

Other Shoulder Milling Tools
D089

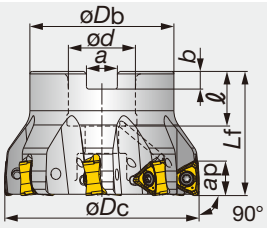
EPH, ELP, EPE, T/EPS17, PES, ESD, TPP, TSE3000/4000, DEB1000

DoForce-Tri

TPTN12

Square Shoulder milling cutters with double-sided triangular insert

A.R. = +4.2°~ +4.7°, R.R. = -15.4°~ -11.2°



Designation	Max. ap	øDc	z	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	C.bolt	Insert
TPTN12M050B22.0R04	11	50	4	47	40	22	20	10.4	6.3	0.4	with	CM10X30H	TN*U12...
TPTN12M050B22.0R05	11	50	5	47	40	22	20	10.4	6.3	0.4	with	CM10X30H	TN*U12...
TPTN12M063B22.0R05	11	63	5	47	40	22	20	10.4	6.3	0.6	with	CM10X30H	TN*U12...
TPTN12M063B22.0R06	11	63	6	47	40	22	20	10.4	6.3	0.6	with	CM10X30H	TN*U12...
TPTN12M080B27.0R06	11	80	6	58	50	27	22	12.4	7	1.1	with	CM12X30H	TN*U12...
TPTN12M080B27.0R08	11	80	8	58	50	27	22	12.4	7	1.1	with	CM12X30H	TN*U12...
TPTN12M100B32.0R07	11	100	7	67	50	32	28.5	14.4	8	1.4	with	TMBA-M16H	TN*U12...
TPTN12M100B32.0R10	11	100	10	67	50	32	28.5	14.4	8	1.4	with	TMBA-M16H	TN*U12...
TPTN12M125B40.0R08	11	125	8	71	63	40	32	16.4	9	2.3	with	TMBA-M20H	TN*U12...
TPTN12M125B40.0R12	11	125	12	71	63	40	32	16.4	9	2.4	with	TMBA-M20H	TN*U12...

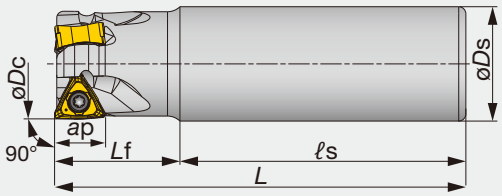
SPARE PARTS

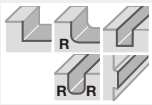
Designation	Clamping screw	Grip	Torx bit	Lubricant	Center bolt	Center bolt 1
TPTN12M050, 063B...	CSPB-3.5	H-TB2W	BLDIP15/S7	M-1000	-	CM10X30H
TPTN12*080B...	CSPB-3.5	H-TB2W	BLDIP15/S7	M-1000	-	CM12X30H
TPTN12*100B...	CSPB-3.5	H-TB2W	BLDIP15/S7	M-1000	TMBA-M16H	-
TPTN12*125B...	CSPB-3.5	H-TB2W	BLDIP15/S7	M-1000	TMBA-M20H	-

EPTN12

Square Shoulder milling endmills with double-sided triangular insert

A.R. = +4.2°~ +4.7°, R.R. = -15.4°~ -11.2°





Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EPTN12M032C32.0R02N	11	32	2	32	80	35	115	0.7	without	TN*U12...
EPTN12M032C32.0R03N	11	32	3	32	80	35	115	0.7	without	TN*U12...
EPTN12M040C32.0R03N	11	40	3	32	80	35	115	0.8	without	TN*U12...
EPTN12M040C32.0R04N	11	40	4	32	80	35	115	0.8	without	TN*U12...

SPARE PARTS

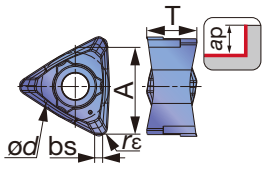
Designation	Clamping screw	Grip	Torx bit	Lubricant
EPTN12...	CSPB-3.5	H-TB2W	BLDIP15/S7	M-1000

Reference pages

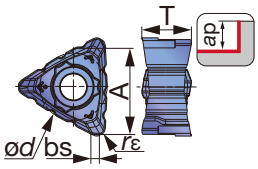
Inserts → **D035**, Standard cutting conditions → **D036**

INSERT

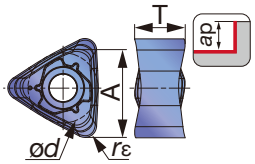
TNGU-MJ



TNGU-NMJ / TNMU-NMJ



TNMU-R-MJ



P	Steel	☆	★		☆
M	Stainless		★		☆
K	Cast iron	★		☆	
N	Non-ferrous				
S	Superalloys	★	☆		
H	Hard materials				

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated				A	ød	T	bs
			AH120	AH3135	T1215	T3225				
TNGU120708PER-MJ	0.8	11	●	●			12	9.525	7.04	1.16
TNGU120708PER-NMJ	0.8	11	●	●			12	9.525	7.04	1.16
TNMU1207R16PER-MJ	1.6	11	●	●			12	9.525	7.04	-
TNMU120708PER-MJ	0.8	11	●	●	●	●	12	9.525	7.04	1.16
TNMU120708PER-NMJ	0.8	11	●	●			12	9.525	7.04	1.16

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel C15E4, E275A, etc.	- 300 HB	First choice	AH3135	MJ	100 - 250	0.08 - 0.3
		- 300 HB	For low cutting force	AH3135	NMJ	100 - 250	0.08 - 0.14
	Carbon steel and alloy steel C55, 42CrMo4, etc.	- 300 HB	First choice	AH3135	MJ	100 - 230	0.08 - 0.3
		- 300 HB	For low cutting force	AH3135	NMJ	100 - 230	0.08 - 0.14
	Prehardened steel NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3135	MJ	100 - 180	0.08 - 0.25
		30 - 40 HRC	For low cutting force	AH3135	NMJ	100 - 180	0.08 - 0.14
M	Stainless steel X5CrNi18-9, X5CrNiMo17-12-3, etc.	-	First choice	AH3135	MJ	90 - 200	0.08 - 0.25
		-	For low cutting force	AH3135	NMJ	90 - 200	0.08 - 0.14
K	Grey cast iron 250, 300, etc.	150 - 250 HB	First choice	AH120	MJ	140 - 250	0.08 - 0.3
		150 - 250 HB	For low cutting force	AH120	NMJ	140 - 250	0.08 - 0.14
	Ductile cast iron 600-3, etc.	150 - 250 HB	First choice	AH120	MJ	110 - 200	0.08 - 0.25
		150 - 250 HB	For low cutting force	AH120	NMJ	110 - 200	0.08 - 0.14
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH120	MJ	20 - 60	0.08 - 0.2
		-	For low cutting force	AH120	NMJ	20 - 60	0.08 - 0.14
	Heat-resistant alloys Inconel718, etc.	-	First choice	AH120	MJ	20 - 40	0.07 - 0.18
		-	For low cutting force	AH120	NMJ	20 - 40	0.07 - 0.14

Note: When you use the NMJ chipbreaker, please set up the feed less than 0.15 mm/t.

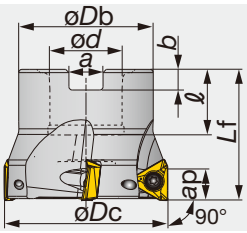
MEMO

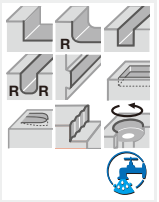
TUNG-TRI

TPA06

High precision square shoulder milling cutters with triangular inserts

A.R. = +8.5°~ +11.5°, R.R. = -5.5°~ -12.5°





Designation	Max. ap	øDc	z	øDb	ød	ℓ	Lf	b	a	Kg	Air hole	Insert
TPA06R032M16.0E05	6	32	5	30	16	18	40	5.6	8.4	0.14	with	TOMT06...
TPA06R040M16.0E06	6	40	6	35	16	18	40	5.6	8.4	0.22	with	TOMT06...
TPA06R050M22.0E08	6	50	8	41	22	20	40	6.3	10.4	0.31	with	TOMT06...

SPARE PARTS

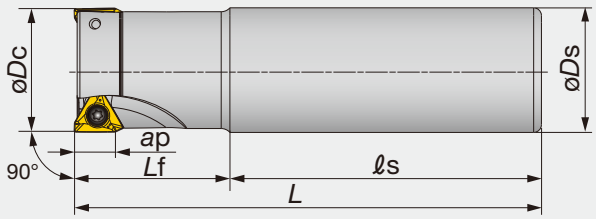
Designation	Clamping screw	Lubricant	Center bolt	Wrench
TPA06R032M16.0E05	CSTB-2.5	M-1000	FSHM8-30H	T-8D
TPA06R040M16.0E06	CSTB-2.5	M-1000	CM8X30H	T-8D
TPA06R050M22.0E08	CSTB-2.5	M-1000	CM10X30H	T-8D

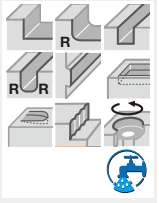
TUNG-TRI

EPA06

High precision square shoulder milling endmills with triangular inserts

A.R. = +8.5°~ +11.5°, R.R. = -5.5°~ -12.5°





Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EPA06R012M16.0-01N	6	12	1	16	50	18	68	0.09	without	TOMT06...
EPA06R016M16.0-02N	6	16	2	16	60	24	84	0.12	without	TOMT06...
EPA06R016M16.0-02L	6	16	2	16	105	40	145	0.2	with	TOMT06...
EPA06R018M16.0-02N	6	18	2	16	60	24	84	0.13	without	TOMT06...
EPA06R018M16.0-02L	6	18	2	16	115	30	145	0.21	with	TOMT06...
EPA06R020M16.0-02N	6	20	2	16	60	30	90	0.14	without	TOMT06...
EPA06R020M20.0-02N	6	20	2	20	70	30	100	0.23	without	TOMT06...
EPA06R020M20.0-03N	6	20	3	20	70	30	100	0.22	without	TOMT06...
EPA06R020M20.0-02L	6	20	2	20	135	50	185	0.41	with	TOMT06...
EPA06R022M20.0-02N	6	22	2	20	70	30	100	0.23	without	TOMT06...
EPA06R022M20.0-03N	6	22	3	20	70	30	100	0.23	without	TOMT06...
EPA06R022M20.0-02L	6	22	2	20	145	40	185	0.42	with	TOMT06...
EPA06R025M25.0-03N	6	25	3	25	80	35	115	0.41	without	TOMT06...
EPA06R025M25.0-04N	6	25	4	25	80	35	115	0.41	without	TOMT06...
EPA06R025M25.0-02L	6	25	2	25	150	70	220	0.78	with	TOMT06...
EPA06R028M25.0-03N	6	28	3	25	80	35	115	0.42	without	TOMT06...
EPA06R028M25.0-04N	6	28	4	25	80	35	115	0.42	without	TOMT06...
EPA06R028M25.0-02L	6	28	2	25	180	40	220	0.8	with	TOMT06...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EPA06R012 - 018M...	CSTB-2.5S	M-1000	T-8D
EPA06R020 - 028M...	CSTB-2.5	M-1000	T-8D

Reference pages

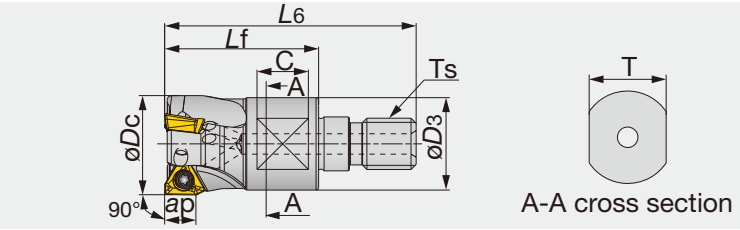
Inserts → **D044**, Standard cutting conditions → **D045**

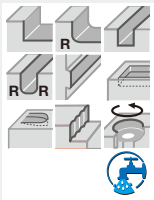
TUNG-TRI

HPA06-M

High precision square shoulder milling endmills with triangular inserts

A.R. = +8.5°~ +11.5°, R.R. = -12.5°~ -5.5°





Designation	Max. ap	øDc	z	L6	Lf	C	T	øD3	Ts	Kg	Air hole	Insert
HPA06R016MM08-02	6	16	2	42	25	8	10	13	M8	0.03	with	TOMT06...
HPA06R020MM10-03	6	20	3	49	30	10	15	18	M10	0.06	with	TOMT06...
HPA06R025MM12-04	6	25	4	57	35	10	17	21	M12	0.1	with	TOMT06...
HPA06R032MM16-05	6	32	5	63	40	12	22	29	M16	0.20	with	TOMT06...

SPARE PARTS

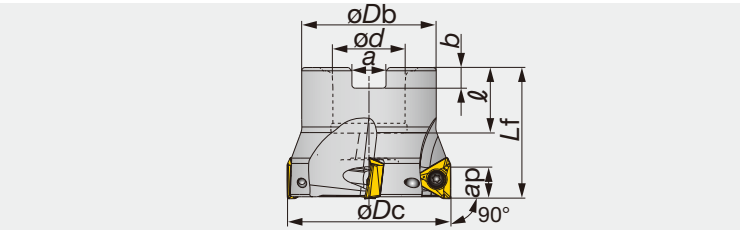
Designation	Clamping screw	Lubricant	Wrench
HPA06R016MM08-02	CSTB-2.5S	M-1000	T-8D
HPA06R020 - 032MM...	CSTB-2.5	M-1000	T-8D

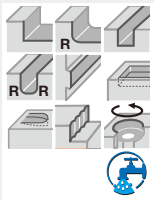
TUNG-TRI

TPA10

High precision square shoulder milling cutters with triangular inserts

A.R. = +9.5°~ +11°, R.R. = -4.5°~ -0.5°





Designation	Max. ap	øDc	z	øDb	ød	ℓ	Lf	b	a	Kg	Air hole	Insert
TPA10R040M16.0E04	10	40	4	35	16	18	40	5.6	8.4	0.2	with	TOMT10...
TPA10R050M22.0E04	10	50	4	41	22	20	40	6.3	10.4	0.31	with	TOMT10...
TPA10R063M22.0E06	10	63	6	41	22	20	40	6.3	10.4	0.51	with	TOMT10...
TPA10R080M27.0E07	10	80	7	58	27	22	50	7	12.4	1.04	with	TOMT10...
TPA10R100M32.0E08	10	100	8	60	32	28.5	50	8	14.4	2.02	with	TOMT10...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Torx bit
TPA10R040M16.0E04	SR14-562/S	SW6-SD	M-1000	CM8X30H	BLDT10/S7
TPA10R050, 063M...	SR14-562/S	SW6-SD	M-1000	CM10X30H	BLDT10/S7
TPA10R080M...	SR14-562/S	SW6-SD	M-1000	CM12X30H	BLDT10/S7
TPA10R100M...	SR14-562/S	SW6-SD	M-1000	CM16X40H	BLDT10/S7

Reference pages

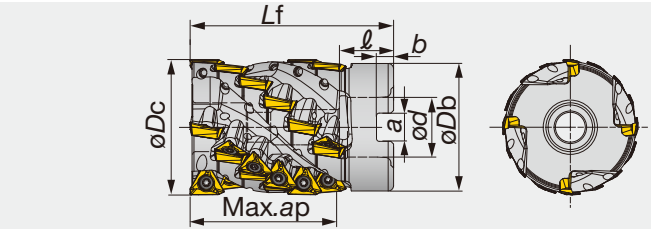
Inserts → **D044**, Standard cutting conditions → **D045**

TUNG-TRI

TLA10

Extended Flute square shoulder mills for roughing with triangular inserts

A.R. = +9.5°~ +11°, R.R. = -4.5°~ -0.5°



Designation	Max. ap	øDc	Z eff	z	øDb	ød	ℓ	Lf	b	a	Kg	Air hole	Insert
TLA10R050L054M22.0E04	54	50	4	24	47	22	20	75	6.3	10.4	0.64	with	TOMT10...
TLA10R063L054M27.0E04	54	63	4	24	60	27	22	80	7	12.4	1.25	with	TOMT10...

SPARE PARTS

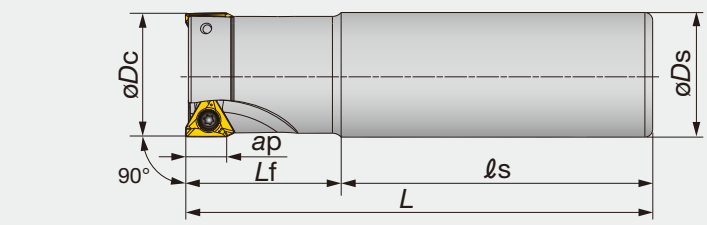
Designation	Clamping screw	Lubricant	Center bolt	Center bolt 1	Wrench
TLA10R050L054M22.0E04	SR14-562	M-1000	CAP-CM10X1.5X55-H	-	T-10D
TLA10R063L054M27.0E04	SR14-562	M-1000	-	CAP-CM12X1.75X50	T-10D

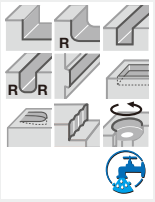
TUNG-TRI

EPA10

High precision square shoulder milling endmills with triangular inserts

A.R. = +9.5°~ +11°, R.R. = -4.5°~ -0.5°





Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EPA10R025M25.0-02N	10	25	2	25	80	35	115	0.38	without	TOMT10...
EPA10R025M25.0-02L	10	25	2	25	150	70	220	0.75	with	TOMT10...
EPA10R028M25.0-02N	10	28	2	25	80	35	115	0.39	without	TOMT10...
EPA10R028M25.0-02L	10	28	2	25	185	35	220	0.78	with	TOMT10...
EPA10R032M32.0-02N	10	32	2	32	80	40	120	0.66	without	TOMT10...
EPA10R032M32.0-03N	10	32	3	32	80	40	120	0.65	without	TOMT10...
EPA10R032M32.0-02L	10	32	2	32	175	80	255	1.46	with	TOMT10...
EPA10R035M32.0-02N	10	35	2	32	80	40	120	0.7	without	TOMT10...
EPA10R035M32.0-03N	10	35	3	32	80	40	120	0.68	without	TOMT10...
EPA10R035M32.0-02L	10	35	2	32	215	40	255	1.52	with	TOMT10...
EPA10R040M32.0-03N	10	40	3	32	80	40	120	0.72	without	TOMT10...
EPA10R040M32.0-04N	10	40	4	32	80	40	120	0.73	without	TOMT10...
EPA10R040M32.0-02L	10	40	2	32	205	50	255	1.57	with	TOMT10...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit
EPA10...	SR14-562/S	SW6-SD	M-1000	BLDT10/S7

Reference pages

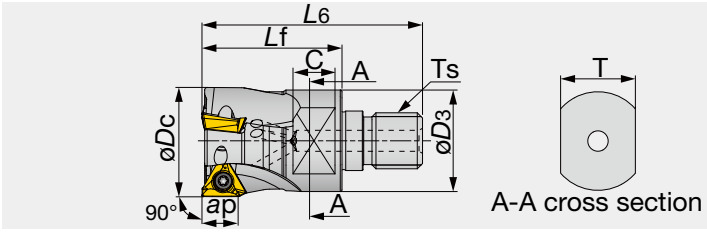
Inserts → **D044**, Standard cutting conditions → **D045**

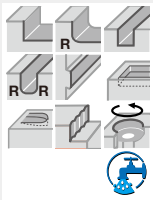
TUNG-TRI

HPA10-M

High precision square shoulder milling endmills with triangular inserts

A.R. = +9.5°~ +11°, R.R. = -4.5°~ -0.5°





Designation	Max. ap	øDc	z	L6	Lf	C	T	øD3	Ts	Kg	Air hole	Insert
HPA10R025MM12-02	10	25	2	57	35	10	17	21	M12	0.08	with	TOMT10...
HPA10R032MM16-03	10	32	3	63	40	12	22	29	M16	0.18	with	TOMT10...

SPARE PARTS

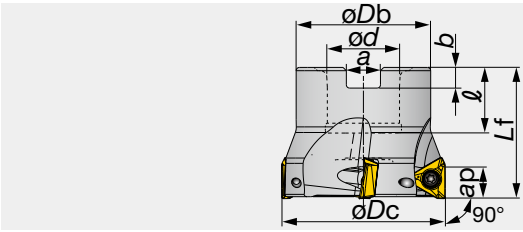
Designation	Clamping screw	Grip	Lubricant	Torx bit
HPA10...	SR14-562/S	SW6-SD	M-1000	BLDT10/S7

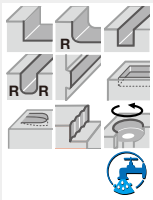
TUNG-TRI

TPA15

High precision square shoulder milling cutters with triangular inserts

A.R. = +12°~ +13.5°, R.R. = -6°~ -3.5°





Designation	Max. ap	øDc	z	øDb	ød	ℓ	Lf	b	a	Kg	Air hole	Insert
TPA15R050M22.0E04	15	50	4	41	22	20	40	6.3	10.4	0.27	with	TOMT15...
TPA15R063M22.0E05	15	63	5	41	22	20	40	6.3	10.4	0.41	with	TOMT15...
TPA15R080M27.0E06	15	80	6	50	27	22	50	7	12.4	0.86	with	TOMT15...
TPA15R100M32.0E07	15	100	7	60	32	28.5	50	8	14.4	1.27	with	TOMT15...
TPA15R125M40.0E08	15	125	8	71	40	32	63	9	16.4	2.47	with	TOMT15...
TPA15R160M40.0E10N	15	160	10	100	40	32	63	9	16.4	4.77	without	TOMT15...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Center bolt 1	Torx bit
TPA15R050M22.0E04	TS45120I	H-TB2W	M-1000	-	FSHM10-40H	BT20S
TPA15R063M22.0E05	TS45120I	H-TB2W	M-1000	-	CM10X30H	BT20S
TPA15R080M27.0E06	TS45120I	H-TB2W	M-1000	-	CM12X30H	BT20S
TPA15R100M32.0E07	TS45120I	H-TB2W	M-1000	TMBA-M16H	-	BT20S
TPA15R125M40.0E08	TS45120I	H-TB2W	M-1000	TMBA-M20H	-	BT20M
TPA15R160M40.0E10N	TS45120I	H-TB2W	M-1000	-	-	BT20M

Reference pages

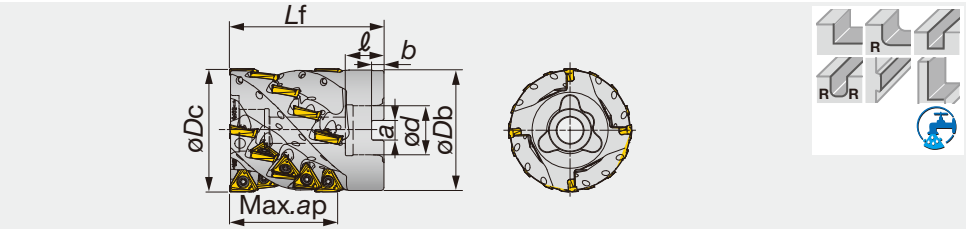
Inserts → **D044**, Standard cutting conditions → **D045**

TUNG-TRI

TLA15-M

Extended Flute square shoulder mills for roughing with triangular inserts

A.R. = +12°~ +13.5°, R.R. = -6°~ -3.5°



Designation	Max. ap	øDc	Z eff	z	øDb	ød	ℓ	Lf	b	a	Kg	Air hole	Insert
TLA15R080L070M32.0E04M	70	80	4	20	78	32	25	100	8	14.4	2.38	with	TOMT15...
TLA15R100L083M40.0E05M	83	100	5	30	98	40	32	110	9	16.4	4.26	with	TOMT15...

SPARE PARTS

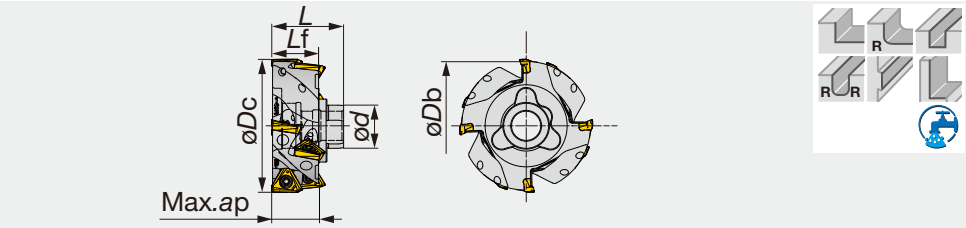
Designation	Clamping screw	Grip	Torx bit	Lubricant	Center bolt
TLA15R080L070M32.0E04M	TS45120I	H-TB2W	BT20S	M-1000	CM16X75
TLA15R100L083M40.0E05M	TS45120I	H-TB2W	BT20S	M-1000	CM20X80

TUNG-TRI

TLA15-S

Sub unit to mount on TLA15-M type for longer Max. ap reach

A.R. = +12°~ +13.5°, R.R. = -6°~ -3.5°



Designation	Max. ap	øDc	Z eff	z	øDb	ød	L	Lf	Kg	Air hole	Insert
TLA15R080L028-04S	28	80	4	8	77.6	27	43	28.2	0.65	with	TOMT15...
TLA15R100L028-05S	28	100	5	10	97.2	33	46	28	1.05	with	TOMT15...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit
TLA15...	TS45120I	H-TB2W	M-1000	BT20S

CENTER BOLT

*Optional parts

No.of sub-units	1	2
TLA15R080L028-04S	CM16x120	CM16x140
TLA15R100L028-05S	CM20x120	CM20x150

Reference pages

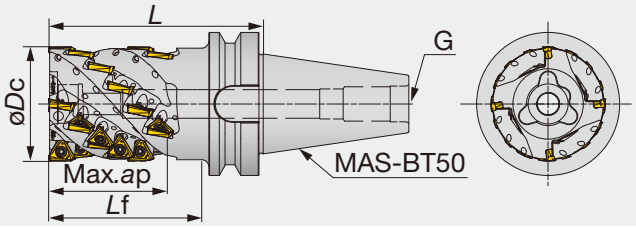
Inserts → **D044**, Standard cutting conditions → **D045**

TUNG-TRI

TLA15-BT

Square shoulder mills for roughing with TOMT15 inserts, Main unit with BT tapered shanks

A.R. = +12°~ +13.5°, R.R. = -6°~ -3.5°



Designation	Max. ap	øDc	Z eff	z	L	Lf	Kg	Air hole	G	Insert
TLA15R080L083BT50-04M	83	80	4	24	150	107	6.29	with	M24	TOMT15...
TLA15R100L097BT50-05M	97	100	5	35	165	126.5	8.92	with	M24	TOMT15...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Torx bit	Center bolt
TLA15R080L083BT50-04M	TS45120I	H-TB2W	M-1000	BT20S	CAP-CM16×2.0×55
TLA15R100L097BT50-05M	TS45120I	H-TB2W	M-1000	BT20S	CAP-CM20×2.5×50

CENTER BOLT

*Optional parts

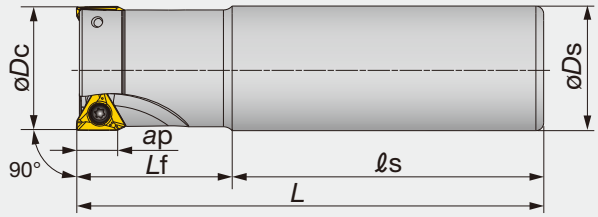
No.of sub-units	1	2
TLA15R080L083BT50-04M	CAP-CM16×2.0×55	CM16x120
TLA15R100L097BT50-05M	CAP-CM20×2.5×50	CM20x80

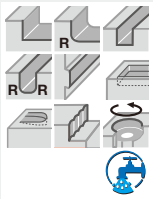
TUNG-TRI

EPA15

High precision square shoulder milling endmills with triangular inserts

A.R. = +12°~ +13.5°, R.R. = -6°~ -3.5°





Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EPA15R040M32.0-03N	15	40	3	32	80	40	120	0.73	without	TOMT15…
EPA15R040M32.0-02L	15	40	2	32	205	50	255	1.56	with	TOMT15…
EPA15R050M32.0-04N	15	50	4	32	80	40	120	0.83	without	TOMT15…
EPA15R050M42.0-02L	15	50	2	42	310	50	360	3.84	with	TOMT15…

SPARE PARTS

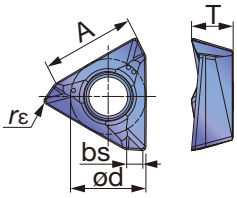
Designation	Clamping screw	Grip	Lubricant	Torx bit
EPA15...	TS45120I	H-TB2W	M-1000	BT20S

Reference pages

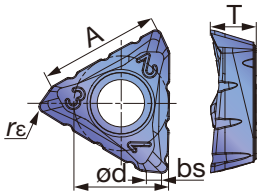
Inserts → **D044**, Standard cutting conditions → **D045**

INSERT

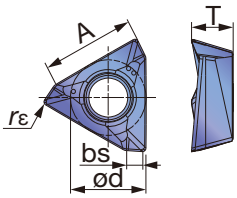
TOMT-MJ



TOMT-NMJ



TOGT-AJ



P	Steel	☆	★			
M	Stainless		★			
K	Cast iron	★		★		
N	Non-ferrous				★	
S	Superalloys	★	☆			
H	Hard materials					

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated			Un-coated	A	ød	T	bs
			AH120	AH3135	T1215	KS05F				
TOMT060302PDER-MJ	0.2	6	●	●			6.2	5.6	3.2	1.4
TOMT060304PDER-MJ	0.4	6	●	●			6.2	5.6	3.2	1.2
TOMT060308PDER-MJ	0.8	6	●	●	●		6.2	5.6	3.2	0.8
TOMT100404PDER-MJ	0.4	10	●	●			10.5	8.6	4.7	1.5
TOMT100408PDER-MJ	0.8	10	●	●	●		10.5	8.6	4.7	1.1
TOMT100416PDER-MJ	1.6	10	●	●			10.5	8.6	4.7	0.2
TOMT150604PDER-MJ	0.4	15	●	●			15.7	12.7	6	2.2
TOMT150608PDER-MJ	0.8	15	●	●	●		15.7	12.7	6	1.9
TOMT150616PDER-MJ	1.6	15	●	●			15.7	12.7	6	1.1
TOMT150620PDER-MJ	2	15	●	●			15.7	12.7	6	0.7
TOMT150608PDER-NMJ	0.8	15	●	●			15.7	12.7	6	1.9
TOGT100404PDFR-AJ	0.4	10				●	10.5	8.6	4.7	1.5
TOGT100408PDFR-AJ	0.8	10				●	10.5	8.6	4.7	1.1

●: Line up

STANDARD CUTTING CONDITIONS

TPA/EPA/HPA

ISO	Workpiece material	Hardness	Grade	Cutting speed: *Vc* (m/min)			Feed per tooth: *fz* (mm/t)		
				T/E/HPA06	T/E/HPA10	T/E/HPA15	T/E/HPA06	T/E/HPA10	T/EPA15
P	Low carbon steel E275A, C15E4, etc.	- 200 HB	AH3135	100 - 220	100 - 250	100 - 250	0.05 - 0.15	0.08 - 0.2	0.08 - 0.25
P	High carbon steel C45, etc.	200 - 300 HB	AH3135	100 - 170	100 - 200	100 - 230	0.05 - 0.12	0.08 - 0.15	0.08 - 0.2
P	Alloy steel 42CrMo4, etc.	200 - 300 HB	AH3135	100 - 170	100 - 200	100 - 230	0.05 - 0.12	0.08 - 0.15	0.08 - 0.2
P	Tool steel X40CrMoV5-1, etc.	30 - 40 HRC	AH3135	100 - 120	100 -150	100 - 180	0.05 - 0.12	0.08 - 0.15	0.08 - 0.2
M	Stainless steel X5CrNi18-9, etc.	-	AH3135	80 - 150	80 - 200	90 - 200	0.05 - 0.15	0.08 - 0.2	0.08 - 0.2
K	Grey cast iron 250, etc.	150 - 250 HB	AH120 T1215	100 - 200 150 - 250	100 - 250 150 - 300	140 - 250 200 - 300	0.05 - 0.15	0.08 - 0.2	0.08 - 0.25
K	Ductile cast iron 450-10S, etc.	150 - 250 HB	AH120 T1215	80 - 150 100 - 200	80 - 200 130 - 250	110 - 200 150 - 250	0.05 - 0.15	0.08 - 0.2	0.08 - 0.25
N	Aluminum alloy (Si < 13%)	-	KS05F	-	300 - 1000	-	-	0.08 - 0.22	-
N	Aluminum alloy (Si ≥ 13%)	-	KS05F	-	100 - 200	-	-	0.08 - 0.2	-
S	Titanium alloys Ti-6Al-4V, etc.	-	AH120	20 - 50	20 - 60	20 - 60	0.05 - 0.1	0.08 - 0.15	0.08 - 0.18
S	Heat-resistant alloys Inconel 718, etc.	-	AH120	20 - 35	20 - 40	20 - 40	0.03 - 0.08	0.05 - 0.13	0.07 - 0.15

Note: When you use the NMJ chipbreaker, please set up the feed less than 0.15 mm/t.

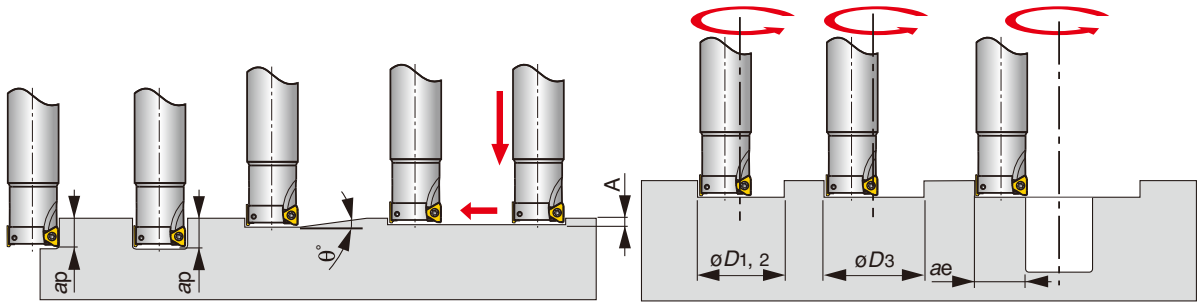
- Remove excessive chip accumulation with an air blast.
- For the operation with depth of cut which varies (ex.casting skin) and machining of workpiece materials with interrupted surface, the feed per tooth (*fz*) should be set to the lower recommended value shown in the above table.
- Cutting conditions maybe limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

TLA (Roughing type)

ISO	Workpiece material	Hardness	Grade	Cutting speed: *Vc* (m/min)		Feed per tooth: *fz* (mm/t)	
				TLA10	TLA15	TLA10	TLA15
P	Low carbon steel E275A, C15E4, etc.	- 200 HB	AH3135	100 - 250	100 - 250	0.08 - 0.18	0.08 - 0.22
P	High carbon steel C45, etc.	200 - 300 HB	AH3135	100 - 200	100 - 270	0.08 - 0.14	0.08 - 0.18
P	Alloy steel 42CrMo4, etc.	200 - 300 HB	AH3135	100 - 150	100 - 180	0.08 - 0.14	0.08 - 0.18
M	Stainless steel X5CrNi18-9, etc.	-	AH3135	80 - 200	90 - 200	0.08 - 0.15	0.08 - 0.18
K	Grey cast iron 250, etc.	150 - 250 HB	AH120 T1215	100 - 250 150 - 250	140 - 250 150 - 250	0.10 - 0.18	0.08 - 0.22
K	Ductile cast iron 450-10S, etc.	150 - 250 HB	AH120 T1215	80 - 200 150 - 250	110 - 200 150 - 250	0.10 - 0.18	0.08 - 0.22
N	Aluminum alloy (Si < 13%)	-	KS05F	300 - 1000	-	0.08 - 0.22	-
N	Aluminum alloy (Si ≥ 13%)	-	KS05F	100 - 200	-	0.08 - 0.22	-
S	Titanium alloys Ti-6Al-4V, etc.	-	AH120	20 - 60	20 - 60	0.00 - 0.14	0.06 - 0.15
S	Heat-resistant alloys Inconel 718, etc.	-	AH120	20 - 40	20 - 40	0.05 - 0.12	0.06 - 0.13

Note: When you use the NMJ chipbreaker, please set up the feed less than 0.15 mm/t.

APPLICATION RANGE



Designation	Tool dia. øDc	Max. depth of cut ap	Max. ramping angle θ°	Max. plunging depth A	Min. machining depth øD1	Max. machining diameter øD2	Max. machining diameter øD3 *	Max. cutting width in enlarging ae
EPA06R012…	12	6	5	0.6	18	23.6	21	11.5
E/HPA06R016…	16	6	4.3	0.6	25	31.6	29	15.5
EPA06R018…	18	6	3.5	0.6	29.5	35.6	33	17.5
E/HPA06R020…	20	6	2.8	0.6	33.5	39.6	37	19.5
EPA06R022…	22	6	2.5	0.6	37.5	43.6	41	21.5
E/HPA06R025…	25	6	2	0.6	43.5	49.6	47	24.5
E/HPA10R025…	25	10	2	0.6	42.1	49.6	47	24.5
EPA06R028…	28	6	1.8	0.6	49.5	55.6	53	27.5
EPA10R028…	28	10	2	0.6	48.1	55.6	53	27.5
H/TPA06R032…	32	6	1.5	0.6	57.5	63.6	61	31.5
E/HPA10R032…	32	10	2	0.6	56.1	63.6	61	31.5
EPA10R035…	35	10	1.7	0.6	62.1	69.6	67	34.5
TPA06R040…	40	6	1	0.6	73.5	79.6	77	39.5
E/TPA10R040…	40	10	1.4	0.6	72.1	79.6	77	39.5
EPA15R040…	40	15	2.3	0.8	68.5	79.2	75.5	39
TPA06R050…	50	6	0.7	0.6	94	99.6	97	49.5
TPA10R050…	50	10	0.9	0.6	92.1	99.6	97	49.5
E/TPA15R050…	50	15	1.7	0.8	88.5	99.2	95.5	49
TPA10R063…	63	10	0.8	0.6	118.1	125.6	123	62.5
TPA15R063…	63	15	1.4	0.8	114.5	125.2	121.5	62
TPA10R080…	80	10	0.6	0.6	152.1	159.6	157	79.5
TPA15R080…	80	15	1	0.8	148.5	159.2	155.5	79
TPA10R100…	100	10	0.5	0.6	192.1	199.6	197	99.5
TPA15R100…	100	15	0.8	0.8	188.5	199.2	195.5	99
TPA15R125…	125	15	0.6	0.8	238.5	249.2	245.5	124
TPA15R160…	160	15	0.5	0.8	308.5	319.2	315.5	159

*Flat bottom hole

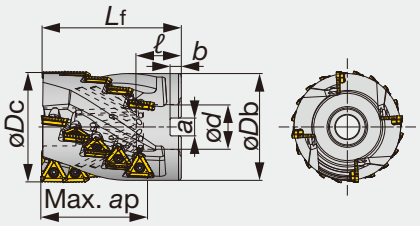
Note: Corner $r\varepsilon$ for dimensions of ø*D*1, ø*D*2 and ø*D*3: $r\varepsilon$ = 0.4 for E/TPA06, E/TPA10 and $r\varepsilon$ = 0.8 for E/TPA15.

TUNGTSHRED

LPTC16

Square shoulder milling cutters for roughing with shred insert

A.R. = +5.5°~ +6.5°, R.R. = -11.5°~ -11.3°



Designation	Max. ap	øDc	Z eff	z	øDb	Lf	ød	ℓ	a	b	Kg	Insert
LPTC16M063B27.0L061R03	61	63	3	12	59	85	27	22	12.4	7	1.24	TC*T16...
LPTC16M080B32.0L076R04	76	80	4	20	76	100	32	25	14.4	8	2.46	TC*T16...

SPARE PARTS

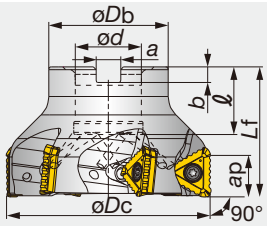
Designation	Clamping screw	Grip	Lubricant	Center bolt	Torx bit
LPTC16M063B27.0L061R03	TS 40B100I	H-TB2W	M-1000	CAP-CM12X1.75X50	BT15S
LPTC16M080B32.0L076R04	TS 40B100I	H-TB2W	M-1000	CM16X75	BT15S

TUNGTSHRED

TPTC16

Square shoulder milling cutters with shred insert

A.R. = +5.5°~ +6.5°, R.R. = -11.5°~ -11.3°



Designation	Max. ap	øDc	z	øDb	Lf	ød	ℓ	a	b	Kg	Insert
TPTC16M050B22.0R04	16	50	4	41	40	22	20	10.4	6.3	0.29	TC*T16...
TPTC16M063B22.0R05	16	63	5	41	40	22	20	10.4	6.3	0.44	TC*T16...
TPTC16M080B27.0R06	16	80	6	50	50	27	22	12.4	7	0.9	TC*T16...
TPTC16M100B32.0R07	16	100	7	60	50	32	28.5	14.4	8	1.35	TC*T16...

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Center bolt 1	Torx bit
TPTC16M050B22.0R04	TS 40B100I	H-TB2W	M-1000	-	FSHM10-40H	BT15S
TPTC16M063B22.0R05	TS 40B100I	H-TB2W	M-1000	-	CM10X30H	BT15S
TPTC16M080B27.0R06	TS 40B100I	H-TB2W	M-1000	-	CM12X30H	BT15S
TPTC16M100B32.0R07	TS 40B100I	H-TB2W	M-1000	TMBA-M16H	-	BT15S

Reference pages

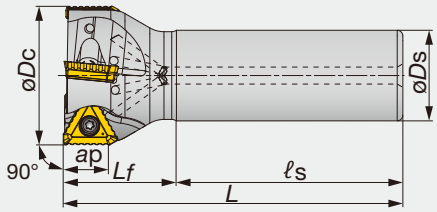
Inserts → **D048**, Standard cutting conditions → **D049**

TUNGTURI SHRED

EPTC16

Square Shoulder milling cutters with shred insert

A.R. = +5.5°~ +6.5°, R.R. = -11.5°~ -11.3°



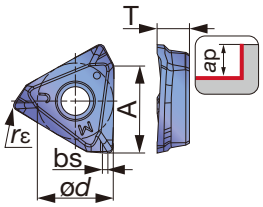
Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Insert
EPTC16M050C32.0R04	16	50	4	32	80	40	120	0.8	TC*T16...
EPTC16M050C42.0R02L	16	50	2	42	310	50	360	3.8	TC*T16...

SPARE PARTS

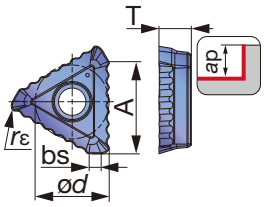
Designation	Clamping screw	Grip	Lubricant	Torx bit
EPTC16...	TS 40B100I	H-TB2W	M-1000	BT15S

INSERT

TCGT-MJ



TCMT-NMJ



P	Steel	☆	★
M	Stainless		★
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys	★	☆
H	Hard materials		

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	Coated AH3135	A	ød	T	bs
TCGT160608PDER-MJ	0.8	16	●	●	16	13.7	5.8	1
TCMT160620PDER-NMJ	2	16	●	●	16	13.3	5.8	2

●: Line up

Reference pages

Standard cutting conditions → **D049**

STANDARD CUTTING CONDITIONS

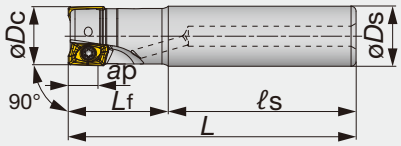
ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel C15, C20, etc.	- 300 HB	First choice	AH3135	NMJ*	100 - 250	0.08 - 0.15
		- 300 HB	For finishing	AH3135	MJ	100 - 250	0.08 - 0.2
	Carbon steel and alloy steel C55, 42CrMo4, etc.	- 300 HB	First choice	AH3135	NMJ*	100 - 230	0.08 - 015
		- 300 HB	For finishing	AH3135	MJ	100 - 230	0.08 - 0.2
	Prehardened steel NAK80, PX5, etc.	30 - 40 HRC	First choice	AH3135	NMJ*	100 - 180	0.08 - 0.15
		30 - 40 HRC	For finishing	AH3135	MJ	100 - 180	0.08 - 0.2
M	Stainless steel X5CrNi18-9, X5CrNiMo17-12-3, etc.	-	First choice	AH3135	NMJ*	90 - 200	0.08 - 0.15
		-	For finishing	AH3135	MJ	90 - 200	0.08 - 0.2
K	Grey cast iron 250, 300, etc.	150 - 250 HB	First choice	AH120	NMJ*	140 - 250	0.08 - 0.15
		150 - 250 HB	For finishing	AH120	MJ	140 - 250	0.08 - 0.25
	Ductile cast iron 400-15,600-3, etc.	150 - 250 HB	First choice	AH120	NMJ*	140 - 250	0.08 - 0.15
		150 - 250 HB	For finishing	AH120	MJ	140 - 250	0.08 - 0.25
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH120	NMJ*	20 - 60	0.08 - 0.15
		-	For finishing	AH120	MJ	20 - 60	0.08 - 0.18
	Heat-resistant alloys Inconel718, etc.	-	First choice	AH120	NMJ*	20 - 40	0.08 - 0.13
		-	For finishing	AH120	MJ	20 - 40	0.08 - 0.15

* When you use the NMJ chipbreaker, please set up the feed less than 0.15 mm/t.

EPAV06

Square shoulder milling endmills in small diameter

A.R. = +6.0°~ +7.6°, R.R. = -37.1°~ -32.4°



Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Insert
EPAV06M008C10.0R01	6	8	1	10	60	20	80	0.04	AVGT06...
EPAV06M010C10.0R02	6	10	2	10	60	20	80	0.04	AVGT06...
EPAV06M010C10.0R02L	6	10	2	10	65	35	100	0.06	AVGT06...
EPAV06M012C12.0R02	6	12	2	12	60	20	80	0.06	AVGT06...
EPAV06M012C12.0R03	6	12	3	12	60	20	80	0.06	AVGT06...
EPAV06M012C12.0R02L	6	12	2	12	85	35	120	0.09	AVGT06...
EPAV06M016C16.0R03	6	16	3	16	70	20	90	0.12	AVGT06...
EPAV06M016C16.0R04	6	16	4	16	70	20	90	0.12	AVGT06...
EPAV06M016C16.0R03L	6	16	3	16	105	35	140	0.2	AVGT06...

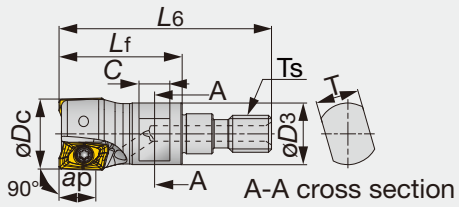
SPARE PARTS

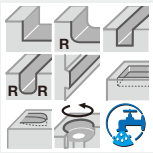
Designation	Clamping screw	Lubricant	Wrench
EPAV06M...	CSPB-2H	M-1000	IP-6DB

HPAV06-M

Square shoulder milling endmills in small diameter; Modular head with TungFlex thread connection

A.R. = +6.0°~ +7.6°, R.R. = -37.1°~ -32.4°





Designation	Max. ap	øDc	z	L6	Lf	C	T	øD3	Ts	Kg	Insert
HPAV06M010M06R02	6	10	2	34.5	20	5	7	9.5	M6	0.01	AVGT06...
HPAV06M012M06R02	6	12	2	34.5	20	5	7	10	M6	0.01	AVGT06...
HPAV06M012M06R03	6	12	3	34.5	20	5	7	10	M6	0.01	AVGT06...
HPAV06M016M08R03	6	16	3	42	25	8	10	13	M8	0.03	AVGT06...
HPAV06M016M08R04	6	16	4	42	25	8	10	13	M8	0.03	AVGT06...

• See page **D192** for TungFlex modular shank.

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
HPAV06M...	CSPB-2H	M-1000	IP-6DB

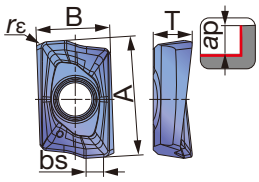
Reference pages

Inserts, Standard cutting conditions → **D051**

INSERT

AVGT-MJ

AVGT-AJ



P	Steel	★	★			
M	Stainless		★			
K	Cast iron	★				
N	Non-ferrous				★	
S	Superalloys	★	☆			
H	Hard materials	★				

★ : First choice
☆ : Second choice

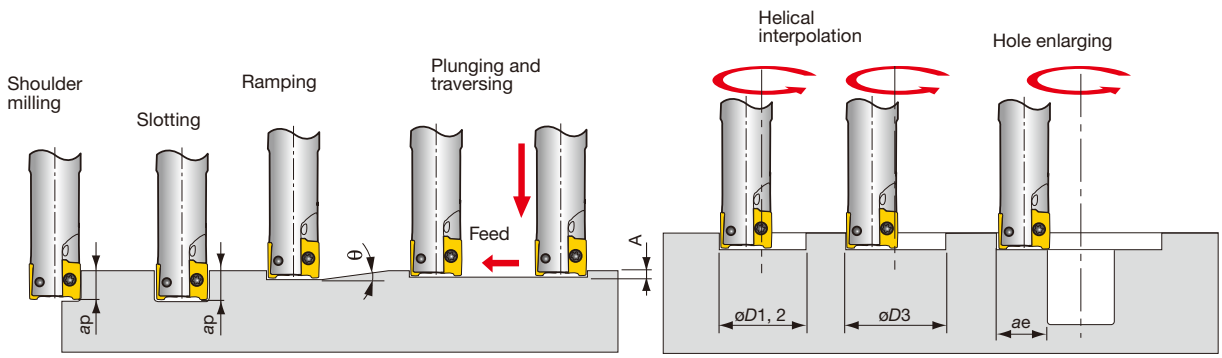
Designation	rε	Max. ap	Coated AH120	Coated AH3135	Un-coated KS05F	A	B	T	bs
AVGT060302PBER-MJ	0.2	6	●	●		8	5	2.7	1.5
AVGT060304PBER-MJ	0.4	6	●	●		8	5	2.7	1.3
AVGT060308PBER-MJ	0.8	6	●	●		8	5	2.6	0.9
AVGT060302PBFR-AJ	0.2	6			●	8	5	2.7	1.5
AVGT060304PBFR-AJ	0.4	6			●	8	5	2.7	1.3
AVGT060308PBFR-AJ	0.8	6			●	8	5	2.6	0.9

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material		Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steel C15E4, E275A, etc.		- 300 HB	First choice	AH3135	MJ	230 - 430	0.07 - 0.12
	Carbon steel and alloy steel C55, 42CrMo4, etc.		- 300 HB	First choice	AH3135	MJ	150 - 350	0.07 - 0.12
	Prehardened steel NAK80, PX5, etc.		30 - 40 HRC	First choice	AH120	MJ	100 - 230	0.07 - 0.12
M	Stainless steel X5CrNi18-9, X5CrNiMo17-12-3, etc.		-	First choice	AH3135	MJ	150 - 220	0.06 - 0.1
K	Grey cast iron 250, 300, etc.		150 - 250 HB	First choice	AH120	MJ	200 - 330	0.07 - 0.12
	Ductile cast iron 600-3, etc.		150 - 250 HB	First choice	AH120	MJ	150 - 240	0.07 - 0.12
N	Aluminium alloys Si < 13%		-	First choice	KS05F	AJ	650 - 1000	0.07 - 0.12
S	Titanium alloys Ti-6Al-4V, etc.		-	First choice	AH120	MJ	70 - 90	0.06 - 0.1
	Superalloys Inconel718, etc.		-	First choice	AH120	MJ	45 - 65	0.06 - 0.09
H	Hardened steel	X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH120	MJ	45 - 70	0.05 - 0.08
		X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	40 - 65	0.04 - 0.06

APPLICATION RANGE



Designation	Tool dia. øDc	Max. depth of cut ap	Max. ramping angle θ	Max. plunging depth A	Min. machining øD1	Max. machining øD2	Max. machining øD3*	Max. cutting width in enlarging ae
EPAV06_008…	8	6	-	-	-	-	-	-
EPAV/HPAV06_010…	10	6	3°	0.3	15	19	18	9.5
EPAV/HPAV06_012…	12	6	3°	0.5	18	23	22	11.5
EPAV/HPAV06_016…	16	6	2.5°	0.6	25	31	30	15.5

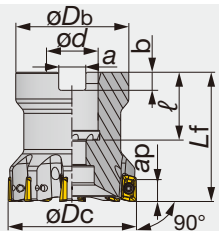
*Flat bottom hole

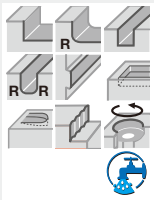
MEMO

TUNGREC
TPO07

High precisionsquare shoulder mills with AOMT/AOGT07 inserts

A.R. = +7°, R.R. = +13°~ +18°





Designation	øDc	z	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TPO07R032M16.0E08	32	8	30	40	16	21	8.4	5.6	0.1	with	AO*T0702...
TPO07R040M16.0E10	40	10	35	40	16	21	8.4	5.6	0.2	with	AO*T0702...
TPO07R050M22.0E12	50	12	41	40	22	22	10.4	6.3	0.3	with	AO*T0702...

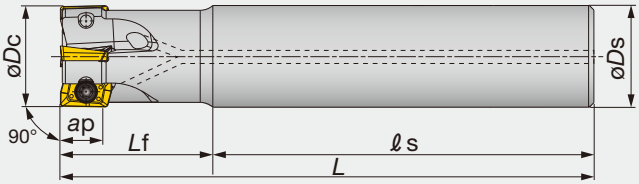
SPARE PARTS

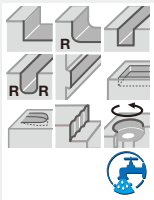
Designation	Clamping screw	Center bolt	Wrench
TPO07R032, 040...	CSTB-2.5L046	CM8X30H	T-7DB
TPO07R050M22.0E12	CSTB-2.5L046	CM10X30H	T-7DB

TUNGREC
EPO07

High precision square shoulder endmills with AOMT/AOGT07 inserts

A.R. = +7°, R.R. = +13°~ +18°





Designation	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EPO07R012M12.0-02	12	2	12	50	18	68	0.1	with	AO*T0702...
EPO07R012M12.0-02L	12	2	12	95	30	125	0.1	with	AO*T0702...
EPO07R016M12.0-02	16	2	12	50	20	70	0.1	with	AO*T0702...
EPO07R016M16.0-02L	16	2	16	105	40	145	0.2	with	AO*T0702...
EPO07R016M16.0-04	16	4	16	60	24	84	0.1	with	AO*T0702...
EPO07R018M16.0-02L	18	2	16	105	40	145	0.2	with	AO*T0702...
EPO07R018M16.0-04	18	4	16	60	24	84	0.1	with	AO*T0702...
EPO07R020M16.0-03	20	3	16	60	30	90	0.1	with	AO*T0702...
EPO07R020M20.0-03L	20	3	20	135	50	185	0.4	with	AO*T0702...
EPO07R020M20.0-05	20	5	20	70	30	100	0.2	with	AO*T0702...
EPO07R022M20.0-03L	22	3	20	135	50	185	0.4	with	AO*T0702...
EPO07R022M20.0-05	22	5	20	70	30	100	0.2	with	AO*T0702...
EPO07R025M20.0-03	25	3	20	60	35	95	0.3	with	AO*T0702...
EPO07R025M25.0-03L	25	3	25	150	70	220	0.7	with	AO*T0702...
EPO07R025M25.0-07	25	7	25	80	35	115	0.4	with	AO*T0702...
EPO07R028M25.0-03L	28	3	25	150	70	220	0.7	with	AO*T0702...
EPO07R028M25.0-07	28	7	25	80	35	115	0.4	with	AO*T0702...

*The *øDc* in the above table shows the diameter when MJ and AJ chipbreakers are used. When HJ chipbreaker is used, the tool diameter is equal to the above shown *øDc* + 0.6 mm.

**The *Lf* and *L* in the above table show the lengths when MJ chipbreaker is used. When AJ chipbreaker is used, the lengths are equal to *Lf*, *L* + 0.1 mm. When HJ chipbreaker is used, the lengths are equal to *Lf*, *L* + 0.5 mm.

SPARE PARTS

Designation	Clamping screw	Wrench
EPO07R012...	SR-10503833-S	T-7DB
EPO07R016 - 028...	CSTB-2.5L046	T-7DB

Reference pages

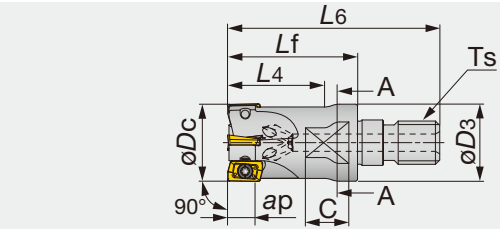
Inserts → **D055**, Standard cutting conditions → **D056**

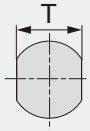
TUNGREC

HPO07-M

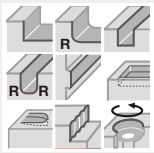
High precision square shoulder endmills (TungRec) for TungFlex, with AOMT/AOGT07 inserts

A.R. = +7°, R.R. = +13°~ +18°





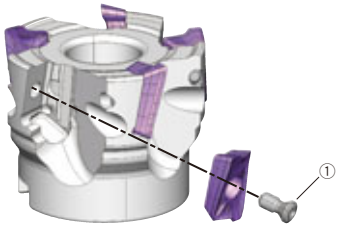
A-A cross section



Designation	øDc	z	L6	Lf	L4	C	T	øD3	Ts	Kg	Air hole	Insert
HPO07R012MM06-02	12	2	39.5	25	-	5	7	9.8	M6	0.01	with	AO*T0702...
HPO07R012MM08-02	12	2	42	25	20	8	10	12.8	M8	0.02	with	AO*T0702...
HPO07R016MM08-04	16	4	42	25	-	8	10	12.8	M8	0.03	with	AO*T0702...
HPO07R016MM10-04	16	4	49	30	20	10	15	17.8	M10	0.05	with	AO*T0702...
HPO07R020MM10-05	20	5	49	30	-	10	15	17.8	M10	0.06	with	AO*T0702...
HPO07R025MM12-07	25	7	57	35	-	10	17	20.8	M12	0.1	with	AO*T0702...

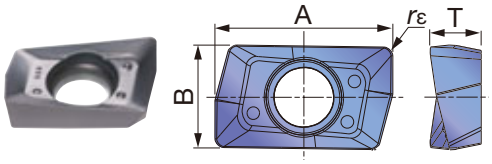
SPARE PARTS

Designation	①Clamping screw	Lubricant	Wrench
HPO07R012MM0*-02	SR-10503833-S	M-1000	T-7DB
HPO07R016 - 025...	CSTB-2.5L046	M-1000	T-7DB

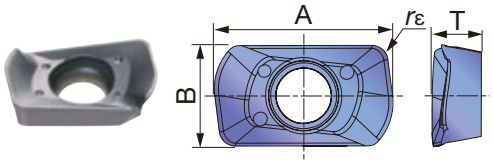


INSERT

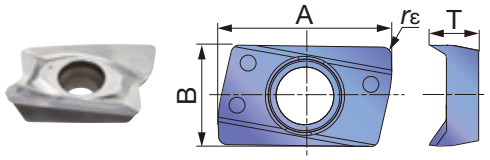
AOMT07-MJ



AOMT07-HJ



AOGT07-AJ



		AH140	AH725	KS15F
P	Steel		★	
M	Stainless	★	☆	
K	Cast iron		★	
N	Non-ferrous			★
S	Superalloys		★	
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH140	Coated AH725	Un-coated KS15F	A	B	T
AOMT070202PDPR-MJ	0.2	7	●	●		8	4.7	2.3
AOMT070204PDPR-MJ	0.4	7	●	●		8	4.7	2.3
AOMT070208PDPR-MJ	0.8	7	●	●		8	4.7	2.3
AOMT070216PDPR-MJ	1.6	7	●	●		8	4.7	2.3
AOMT070208PDPR-HJ	0.8	0.8	●	●		8.8	4.9	2.4
AOGT070204PDFR-AJ	0.4	6.4			●	8.1	4.7	2.3

●: Line up

Reference pages

Standard cutting conditions → **D056**

STANDARD CUTTING CONDITIONS

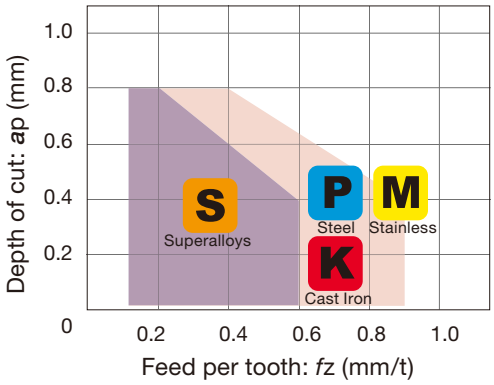
ISO	Workpiece material	Hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) MJ	HJ	AJ
P	Low carbon steel C15E4, etc.	< 200	AH725	90 - 200	0.05 - 0.1	0.4 - 0.9	-
	High carbon steel and alloy steel C55, 42CrMo4, etc.	200 - 300	AH725	90 - 150	0.05 - 0.1	0.4 - 0.9	-
	Tool steel X153CrMoV12, etc.	150 - 300	AH725	80 - 120	0.05 - 0.1	0.4 - 0.9	-
M	Stainless steel X5CrNi18-9, etc.	-	AH140	90 - 150	0.05 - 0.1	0.4 - 0.9	-
K	Grey cast irons 250, etc.	150 - 250	AH725	100 - 180	0.05 - 0.1	0.4 - 0.9	-
	Ductile cast irons 450-10S, etc.	150 - 250	AH725	80 - 150	0.05 - 0.1	0.4 - 0.9	-
N	Aluminium alloys Si < 13%	-	KS15F	300 - 1000	-	-	0.08 - 0.2
	Aluminium alloys Si ≥ 13%	-	KS15F	100 - 200	-	-	0.08 - 0.2
S	Titanium alloys Ti-6Al-4V, etc.	-	AH725	20 - 50	0.05 - 0.1	0.4 - 0.9	-
	Superalloys Inconel 718, etc.	-	AH725	20 - 35	0.05 - 0.08	0.2 - 0.6	-

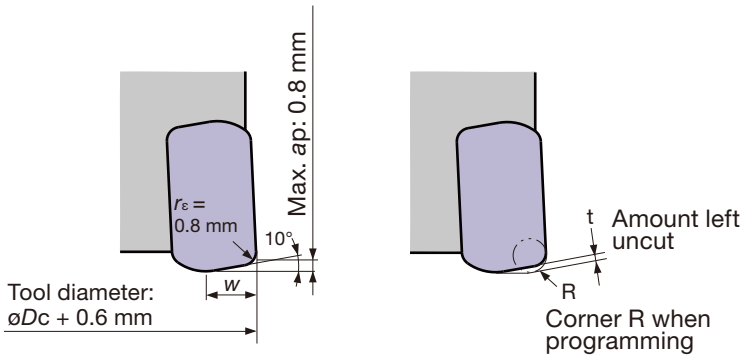
- To remove excessive chip accumulation use an air blast.
- To avoid build up edge on the cutting edges (aluminium machining), use a water soluble coolant.
- When cutting an interrupted surface or a casted skin, the feed per tooth (*fz*) should be reduced to the lower recommended value shown in the above table.
- Cutting conditions are limited by machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.
- For application range see page D072.

CAUTIONARY POINTS WHEN USING HJ INSERTS

HJ type inserts are designed for high feed machining.
Please note the following when using HJ inserts:
1. The shape of HJ insert differs from that of other inserts (MJ, AJ). However the same insert pocket can be used.
2. When using HJ inserts, all the inserts on the cutter body must be HJ type. Do not use other types of inserts (MJ and AJ types) with HJ inserts on the same cutter body.
3. When using CAD/CAM, please program it as a radius cutter. The table below shows the corner R when programming and the uncut area (t).
4. With HJ inserts, the tool diameter increases by 0.6 mm over the diameter ø*Dc* shown in the table.

TungRec 07 type HJ inserts Standard conditions



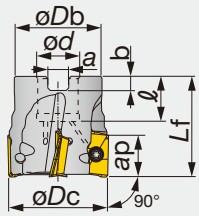


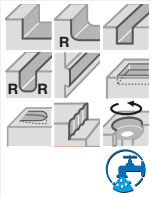
Max. depth of cut max ap (mm)	Main cutting edge length *W* (mm)	Corner R when programming	Amount left uncut t (mm)
0.8	3	R 0.5	0.4
		R 1	0.3

MEMO

TUNGREC
TPO11
High precision square shoulder mills with ASMT/ASGT11 inserts

A.R. = +8.7°~ +18°, R.R. = –5.3°~ –19.4°





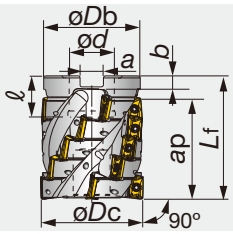
Designation	Max. ap	øDc	z	øDb	ød	ℓ	Lf	b	a	Kg	Air hole	Insert
TPO11R040M16.0E06	10.6	40	6	35	16	18	40	5.6	8.4	0.21	with	AS*T11T3...
TPO11R050M22.0E07	10.6	50	7	45	22	20	40	6.3	10.4	0.35	with	AS*T11T3...
TPO11R063M22.0E08	10.6	63	8	47	22	20	45	6.3	10.4	0.59	with	AS*T11T3...
TPO11R080M27.0E10	10.6	80	10	58	27	22	50	7	12.4	1.05	with	AS*T11T3...
TPO11R100M32.0E11	10.6	100	11	70	32	25	63	8	14.4	2.01	with	AS*T11T3...

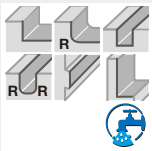
SPARE PARTS

Designation	Clamping screw	Lubricant	Center bolt	Wrench
TPO11R040M16.0E06	CSPB-2.5	M-1000	CM8X30H	IP-8D
TPO11R050, 063...	CSPB-2.5	M-1000	CM10X30H	IP-8D
TPO11R080M27.0E10	CSPB-2.5	M-1000	CM12X30H	IP-8D
TPO11R100M32.0E11	CSPB-2.5	M-1000	CM16X40H	IP-8D

TUNGREC
TLS11
Highly productive square shoulder mills for roughing with ASMT/ASGT11 inserts

A.R. = +8.7°~ +18°, R.R. = –5.3°~ –19.4°





Designation	Max. ap	øDc	Z eff	z	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TLS11R050M22.0E04	48.8	50	4	20	47	60	22	20	10.4	6.3	0.5	with	AS*T11T3...

SPARE PARTS

Designation	Clamping screw	Lubricant	Center bolt	Wrench
TLS11R050M22.0E04	CSPB-2.5	M-1000	CM10X40H	IP-8D

Reference pages

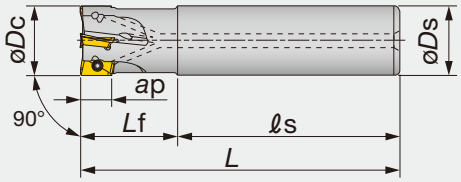
Inserts → **D061**, Standard cutting conditions → **D062 - D063**

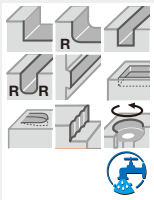
TUNGREC

EPO11

High precision square shoulder endmills with ASMT/ASGT11 inserts

A.R. = +8.7°~ +18°, R.R. = –5.3°~ –19.4°





Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EPO11R012M16.0-01	10.6	12	1	16	60	25	85	0.11	with	AS*T11T3...
EPO11R012M16.0-01L	10.6	12	1	16	95	30	125	0.16	with	AS*T11T3...
EPO11R016M16.0-02	10.6	16	2	16	60	25	85	0.12	with	AS*T11T3...
EPO11R016M16.0-02L	10.6	16	2	16	105	40	145	0.2	with	AS*T11T3...
EPO11R018M16.0-02	10.6	18	2	16	60	25	85	0.12	with	AS*T11T3...
EPO11R018M16.0-02L	10.6	18	2	16	105	40	145	0.21	with	AS*T11T3...
EPO11R020M20.0-02	10.6	20	2	20	70	30	100	0.22	with	AS*T11T3...
EPO11R020M20.0-02L	10.6	20	2	20	135	50	185	0.41	with	AS*T11T3...
EPO11R020M20.0-03	10.6	20	3	20	70	30	100	0.21	with	AS*T11T3...
EPO11R022M20.0-02	10.6	22	2	20	70	30	100	0.22	with	AS*T11T3...
EPO11R022M20.0-02L	10.6	22	2	20	155	30	185	0.42	with	AS*T11T3...
EPO11R022M20.0-03	10.6	22	3	20	70	30	100	0.22	with	AS*T11T3...
EPO11R025M25.0-02L	10.6	25	2	25	150	70	220	0.76	with	AS*T11T3...
EPO11R025M25.0-03	10.6	25	3	25	80	35	115	0.39	with	AS*T11T3...
EPO11R025M25.0-04	10.6	25	4	25	80	35	115	0.38	with	AS*T11T3...
EPO11R028M25.0-02L	10.6	28	2	25	185	35	220	0.8	with	AS*T11T3...
EPO11R028M25.0-03	10.6	28	3	25	80	35	115	0.4	with	AS*T11T3...
EPO11R028M25.0-04	10.6	28	4	25	80	35	115	0.39	with	AS*T11T3...
EPO11R030M25.0-02L	10.6	30	2	25	180	40	220	0.8	with	AS*T11T3...
EPO11R030M25.0-03	10.6	30	3	25	80	40	120	0.43	with	AS*T11T3...
EPO11R030M25.0-04	10.6	30	4	25	80	40	120	0.42	with	AS*T11T3...
EPO11R032M32.0-02L	10.6	32	2	32	175	80	255	1.48	with	AS*T11T3...
EPO11R032M32.0-03	10.6	32	3	32	80	40	120	0.68	with	AS*T11T3...
EPO11R032M32.0-05	10.6	32	5	32	80	40	120	0.67	with	AS*T11T3...
EPO11R035M32.0-02L	10.6	35	2	32	215	40	255	1.49	with	AS*T11T3...
EPO11R035M32.0-03	10.6	35	3	32	80	40	120	0.69	with	AS*T11T3...
EPO11R035M32.0-05	10.6	35	5	32	80	40	120	0.67	with	AS*T11T3...
EPO11R040M32.0-02L	10.6	40	2	32	205	50	255	1.53	with	AS*T11T3...
EPO11R040M32.0-04	10.6	40	4	32	80	40	120	0.72	with	AS*T11T3...
EPO11R040M32.0-06	10.6	40	6	32	80	40	120	0.71	with	AS*T11T3...
EPO11R050M32.0-05	10.6	50	5	32	80	40	120	0.83	with	AS*T11T3...
EPO11R050M32.0-07	10.6	50	7	32	80	40	120	0.82	with	AS*T11T3...
EPO11R050M42.0-03L	10.6	50	3	42	310	50	360	3.78	with	AS*T11T3...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EPO11R012 - 022...	CSPB-2.5S	M-1000	IP-8D
EPO11R025 - 050...	CSPB-2.5	M-1000	IP-8D

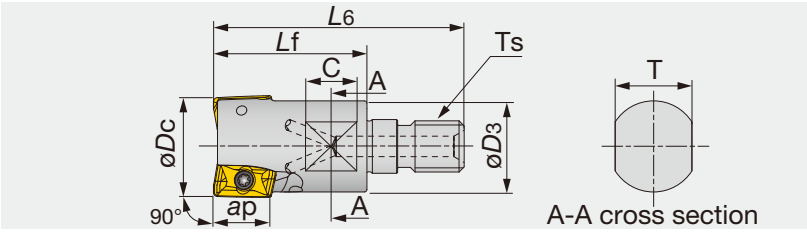
Reference pages

Inserts → **D061**, Standard cutting conditions → **D062 - D063**

TUNGREC
HPO11-M

High precision shoulder square endmills (TungRec) with TungFlex, carrying ASMT/ASGT11 inserts

A.R. = +8.7° ~ +18°, R.R. = -5.3° ~ -19.4°



Designation	Max. ap	øDc	z	L6	Lf	C	T	øD3	Ts	Kg	Air hole	Insert
HPO11R020MM10-02	10.6	20	2	49	30	10	15	17.8	M10	0.06	with	AS*T11T3...
HPO11R025MM12-03	10.6	25	3	57	35	10	17	20.8	M12	0.1	with	AS*T11T3...
HPO11R032MM16-03	10.6	32	3	63	40	12	22	28.8	M16	0.2	with	AS*T11T3...

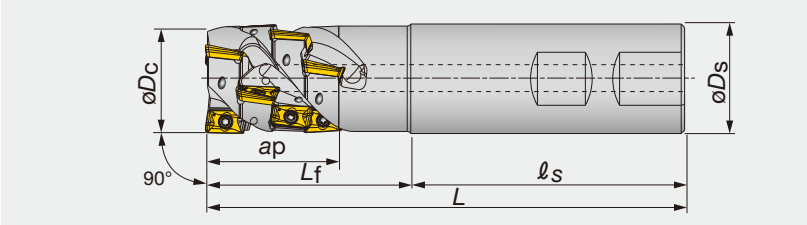
SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
HPO11R020MM10-02	CSPB-2.5S	M-1000	IP-8D
HPO11R025, 032...	CSPB-2.5	M-1000	IP-8D

TUNGREC
ELS11

Highly productive endmills for roughing with ASMT/ASGT11 inserts

A.R. = +8.7° ~ +18°, R.R. = -5.3° ~ -19.4°



Designation	Max. ap	øDc	Z eff	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
ELS11R025M25.0W02	30.4	25	2	6	25	80	40	120	0.4	with	AS*T11T3...
ELS11R032M32.0W03	39.4	32	3	12	32	80	60	140	0.8	with	AS*T11T3...
ELS11R040M42.0W03	40	40	3	12	42	90	60	150	1.4	with	AS*T11T3...

SPARE PARTS

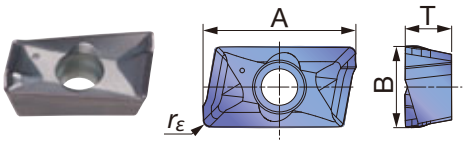
Designation	Clamping screw	Lubricant	Wrench
ELS11...	CSPB-2.5	M-1000	IP-8D

Reference pages

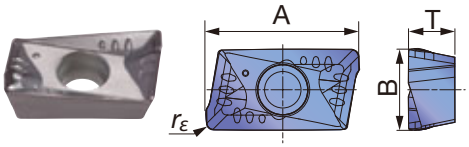
Inserts → **D061**, Standard cutting conditions → **D062 - D063**

INSERT

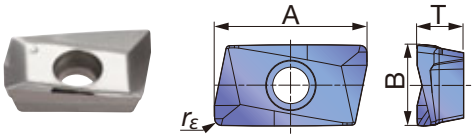
ASMT11-MJ



ASMT11-MS



ASGT11-AJ



		AH120	AH130	AH140	AH725	T1115	T1215	T3130	DS1100	NS740	KS05F
P	Steel				★			☆		☆	
M	Stainless		★								
K	Cast iron	★				☆	☆				
N	Non-ferrous								★		★
S	Superalloys		★		★						
H	Hard materials										

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated								Cermet	Un-coated	A	B	T
			AH120	AH130	AH140	AH725	T1115	T1215	T3130	DS1100	NS740	KS05F			
ASMT11T304PDPR-MJ	0.4	10.6	●			●	●		●		●		12.3	6.7	3.7
ASMT11T308PDPR-MJ	0.8	10.6	●	●		●	●	●	●		●		12.3	6.7	3.7
ASMT11T312PDPR-MJ	1.2	10.6	●			●			●				12.3	6.7	3.7
ASMT11T316PDPR-MJ	1.6	10.6	●			●			●		●		12.3	6.7	3.7
ASMT11T320PDPR-MJ	2	10.6	●										12.3	6.7	3.7
ASMT11T330PDPR-MJ	3	10.6	●										12.3	6.7	3.7
ASMT11T304PDPR-MS	0.4	10.6		●	●								12.3	6.7	3.7
ASGT11T304PDFR-AJ	0.4	10.6								●		●	12.3	6.7	3.7
ASGT11T308PDFR-AJ	0.8	10.6								●		●	12.3	6.7	3.7

●: Line up

STANDARD CUTTING CONDITIONS

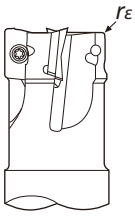
TPO11/EPO11/HPO11 type

ISO	Workpiece material	Brinell hardness HB	Priority	Grade	Cutting speed: *Vc* (m/min)	Feed per tooth: *fz* (mm/t) MJ	MS	AJ
P	Low carbon steel C15E4, etc.	~ 200	First choice	AH725	100 - 250	0.1 - 0.2	-	-
		~ 200	For wear resistance	T3130	100 - 250	0.1 - 0.2	-	-
		~ 200	For surface appearance	NS740	100 - 250	0.05 - 0.15	-	-
	High carbon steel and alloy steel C55, 42CrMo4, etc.	200 ~ 300	First choice	AH725	100 - 200	0.1 - 0.15	-	-
		200 ~ 300	For wear resistance	T3130	100 - 200	0.1 - 0.15	-	-
		200 ~ 300	For surface appearance	NS740	100 - 200	0.05 - 0.12	-	-
	Tool steel X153CrMoV12, etc.	150 ~ 300	First choice	AH725	100 - 150	0.1 - 0.15	-	-
		150 ~ 300	For wear resistance	T3130	100 - 150	0.1 - 0.15	-	-
M	Stainless steel X5CrNi18-9, etc.	-	-	AH130	80 - 200	-	0.08 - 0.2	-
K	Grey cast irons 250, etc.	150 ~ 250	First choice	AH120	100 - 250	0.12 - 0.2	-	-
		150 ~ 250	For wear resistance	T1215 T1115	100 - 250	0.12 - 0.2	-	-
	Ductile cast irons 450-10S, etc.	150 ~ 250	First choice	AH120	80 - 200	0.12 - 0.2	-	-
		150 ~ 250	For wear resistance	T1215 T1115	80 - 200	0.12 - 0.2	-	-
N	Aluminium alloys Si < 13%	-	-	DS1100	300 - 1000	-	-	0.05 - 0.2
	Aluminium alloys Si ≥ 13%	-	-	DS1100	100 - 200	-	-	0.05 - 0.2
	Copper alloys	-	-	KS05F	200 - 500	-	-	0.05 - 0.2
S	Titanium alloys Ti-6Al-4V, etc.	-	-	AH130	20 - 60	-	0.08 - 0.15	-
	Superalloys Inconel 718, etc.	-	-	AH725	20 - 40	0.08 - 0.13	-	-

CAUTIONARY POINT IN MODIFYING CUTTER BODIES

When using inserts with corner radius $r_\varepsilon \geq 2.0$ mm, standard cutter bodies have to be modified "R". (Only for TPS11, EPS11, TLS11, ELS11, HPO11, EPO11)

- From 2nd row onwards, please use insert with $r_\varepsilon = 0.4$ or 0.8 mm
- For application range see page D068.



Corner radius r_ε (mm)	The dimension of modifying (mm)
0.4 ~ 1.6	Unnecessary
2.0 ~ 3.2	2

STANDARD CUTTING CONDITIONS

Roughing type TLS11 / ELS11

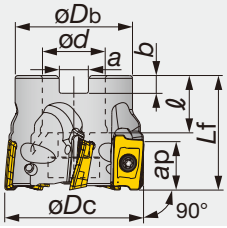
ISO	Workpiece material	Brinell hardness HB	Priority	Grade	Cutting speed: *Vc* (m/min)	Feed per tooth: *fz* (mm/t)		
						MJ	MS	AJ
P	Low carbon steel C15E4, etc.	~ 200	First choice	AH725	100 - 250	0.10 - 0.18	-	-
		~ 200	For wear resistance	T3130	100 - 250	0.10 - 0.18	-	-
	High carbon steel and alloy steel C55, 42CrMo4, etc.	200 ~ 300	First choice	AH725	100 - 200	0.08 - 0.14	-	-
		200 ~ 300	For wear resistance	T3130	100 - 200	0.08 - 0.14	-	-
	Tool steel X153CrMoV12, etc.	150 ~ 300	First choice	AH725	100 - 200	0.08 - 0.14	-	-
		150 ~ 300	For wear resistance	T3130	100 - 200	0.08 - 0.14	-	-
M	Stainless steel X5CrNi18-9, etc.	-	-	AH130	100 - 150	-	0.08 - 0.15	-
K	Grey cast irons 250, etc.	150 ~ 250	First choice	AH120	100 - 250	0.10 - 0.18	-	-
		150 ~ 250	For wear resistance	T1215 T1115	100 - 250	0.10 - 0.18	-	-
	Ductile cast irons 450-10S, etc.	150 ~ 250	First choice	AH120	80 - 200	0.10 - 0.18	-	-
		150 ~ 250	For wear resistance	T1215 T1115	80 - 200	0.10 - 0.18	-	-
N	Aluminium alloys Si < 13%	-	-	DS1100	200 - 500	-	-	0.05 - 0.18
	Aluminium alloys Si ≥ 13%	-	-	DS1100	100 - 200	-	-	0.05 - 0.18
S	Titanium alloys Ti-6Al-4V, etc.	-	-	AH130	20 - 60	-	0.08 - 0.14	-
	Superalloys Inconel718, etc.	-	-	AH725	20 - 40	0.06 - 0.12	-	-

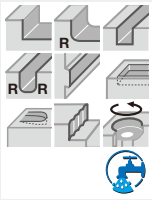
· To remove excessive chip accumulation use an air blast.
· To avoid build up edge on the cutting edges (aluminium machining), use a water soluble coolant.
· When cutting an interrupted surface or a casted skin, the feed per tooth (*fz*) should be reduced to the lower recommended value shown in the above table.
· Cutting conditions are limited by machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

MEMO

High precision square shoulder milling cutters with AOMT/AOGT18 inserts

A.R. = +14° ~ +17°, R.R. = +22° ~ +31°





Designation	Max. ap	øDc	z	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TPO18R040M16.0E04	16.7	40	4	35	40	16	18	8.4	5.6	0.2	with	AO*T1805...
TPO18R050M22.0E05	16.7	50	5	41	40	22	20	10.4	6.3	0.3	with	AO*T1805...
TPO18R063M22.0E06	16.7	63	6	41	40	22	20	10.4	6.3	0.5	with	AO*T1805...
TPO18R080M27.0E07	16.7	80	7	50	50	27	22	12.4	7	10	with	AO*T1805...
TPO18R100M32.0E08	16.7	100	8	60	50	32	28.5	14.4	8	1.4	with	AO*T1805...
TPO18R125M40.0E09	16.7	125	9	71	63	40	32	16.4	9	2.8	with	AO*T1805...
TPO18R160M40.0E10	16.7	160	10	100	63	40	29	16.4	9	4.9	without	AO*T1805...

SPARE PARTS

Designation	Clamping screw	Grip	Center bolt	Center bolt 1	Torx bit
TPO18R040M16.0E04	CSTB-4L093	H-TBS	-	FSHM8-30H	BT15M
TPO18R050M22.0E05	CSTB-4L093	H-TBS	-	CM10X30H	BT15M
TPO18R063M22.0E06	CSTB-4L093	H-TBS	-	CM10X30H	BT15M
TPO18R080M27.0E07	CSTB-4L120	H-TBS	-	CM12X30H	BT15M
TPO18R100M32.0E08	CSTB-4L120	H-TBS	TMBA-M16H	-	BT15M
TPO18R125M40.0E09	CSTB-4L120	H-TBS	TMBA-M20H	-	BT15M
TPO18R160M40.0E10	CSTB-4L120	H-TBS	-	-	BT15M

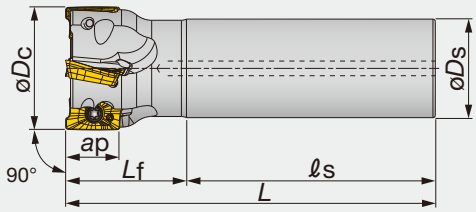
Reference pages

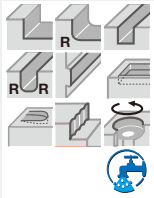
Inserts, Standard cutting conditions → **D067**

EPO18

High precision square shoulder endmills with AOMT/AOGT18 inserts

A.R. = +14° ~ +17°, R.R. = +22° ~ +31°





Designation	Max. *ap*	*øDc*	z	*øDs*	*ℓs*	*Lf*	*L*	Kg	Air hole	Insert
EPO18R025M25.0-02	16.7	25	2	25	80	35	115	0.4	with	AO*T1805...
EPO18R025M25.0-02L	16.7	25	2	25	150	70	220	0.8	with	AO*T1805...
EPO18R028M25.0-02	16.7	28	2	25	80	35	115	0.4	with	AO*T1805...
EPO18R028M25.0-02L	16.7	28	2	25	150	70	220	0.8	with	AO*T1805...
EPO18R030M32.0-02	16.7	30	2	32	80	40	120	0.6	with	AO*T1805...
EPO18R030M32.0-02L	16.7	30	2	32	175	80	255	1.4	with	AO*T1805...
EPO18R030M32.0-03	16.7	30	3	32	80	40	120	0.6	with	AO*T1805...
EPO18R032M32.0-02	16.7	32	2	32	80	40	120	0.7	with	AO*T1805...
EPO18R032M32.0-02L	16.7	32	2	32	175	80	255	1.5	with	AO*T1805...
EPO18R032M32.0-03	16.7	32	3	32	80	40	120	0.6	with	AO*T1805...
EPO18R035M32.0-02	16.7	35	2	32	80	40	120	0.7	with	AO*T1805...
EPO18R035M32.0-02L	16.7	35	2	32	175	80	255	1.5	with	AO*T1805...
EPO18R035M32.0-03	16.7	35	3	32	80	40	120	0.7	with	AO*T1805...
EPO18R040M32.0-02L	16.7	40	2	32	205	50	255	1.6	with	AO*T1805...
EPO18R040M32.0-03	16.7	40	3	32	80	40	120	0.7	with	AO*T1805...
EPO18R040M32.0-04	16.7	40	4	32	80	40	120	0.7	with	AO*T1805...
EPO18R040M42.0-02L	16.7	40	2	42	210	100	310	3	with	AO*T1805...
EPO18R050M32.0-03	16.7	50	3	32	80	40	120	0.8	with	AO*T1805...
EPO18R050M32.0-05	16.7	50	5	32	80	40	120	0.8	with	AO*T1805...
EPO18R050M42.0-03L	16.7	50	3	42	310	50	360	3.8	with	AO*T1805...
EPO18R063M32.0-04	16.7	63	4	32	80	45	125	1	with	AO*T1805...
EPO18R063M32.0-06	16.7	63	6	32	80	45	125	1.1	with	AO*T1805...
EPO18R063M42.0-03L	16.7	63	3	42	310	50	360	4	with	AO*T1805...

SPARE PARTS

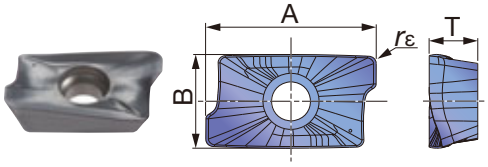
Designation	Clamping screw	Wrench
EPO18R025 - 030...	CSTB-4L085	T-15DB
EPO18R032 - 050...	CSTB-4L093	T-15DB
EPO18R063M...	CSTB-4L120	T-15DB

Reference pages

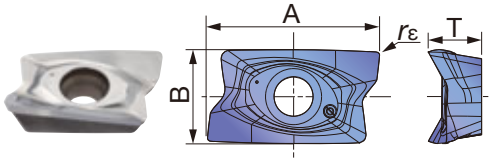
Inserts, Standard cutting conditions → **D067**

INSERT

AOMT18-MJ



AOGT18-AJ



		Coated		Un-coated
		AH140	AH725	KS15F
P	Steel		★	
M	Stainless	★	☆	
K	Cast iron		★	
N	Non-ferrous			★
S	Superalloys		★	
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	AH140	AH725	KS15F	A	B	T
AOMT180508PDPR-MJ	0.8	16.7	●	●		19.5	10.7	5.6
AOMT180516PDPR-MJ	1.6	16.7	●	●		19.5	10.7	5.6
AOMT180524PDPR-MJ	2.4	16.7	●	●		19.5	10.7	5.6
AOMT180532PDPR-MJ	3.2	16.7	●	●		19.5	10.7	5.6
AOGT180504PDFR-AJ	0.4	16.7			●	19.8	10.8	6.1
AOGT180508PDFR-AJ	0.8	16.7			●	19.8	10.8	6.1

●: Line up

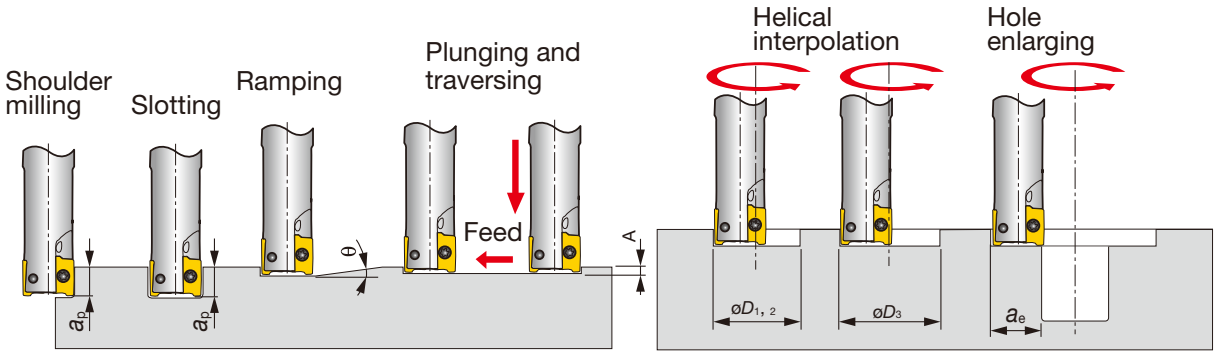
STANDARD CUTTING CONDITIONS

TPO18/EPO18 type

ISO	Workpiece material	Brinell hardness HB	Grade	Cutting speed Vc (m/min)	Feed per tooth: fz (mm/t) MJ	Feed per tooth: fz (mm/t) AJ
P	Low carbon steel C15E4, etc.	~ 200	AH725	100 - 250	0.08 - 0.25	-
	High carbon steel and alloy steel C55, 42CrMo4, etc.	200 ~ 300	AH725	100 - 230	0.08 - 0.2	-
	Tool steel X153CrMoV12, etc.	150 ~ 300	AH725	100 - 180	0.08 - 0.2	-
M	Stainless steel X5CrNi18-9, etc.	-	AH140	90 - 200	0.08 - 0.2	-
K	Grey cast irons 250, etc.	150 ~ 250	AH725	140 - 250	0.08 - 0.25	-
	Ductile cast irons 450-10S, etc.	150 ~ 250	AH725	110 - 200	0.08 - 0.25	-
N	Aluminium alloys Si < 13%	-	KS15F	300 - 1000	-	0.05 - 0.25
	Aluminium alloys Si ≥ 13%	-	KS15F	100 - 200	-	0.05 - 0.25
S	Titanium alloys Ti-6Al-4V, etc.	-	AH725	20 - 60	0.08 - 0.18	-
	Superalloys Inconel718, etc.	-	AH725	20 - 40	0.08 - 0.15	-

· To remove excessive chip accumulation use an air blast.
· To avoid build up edge on the cutting edges (aluminium machining), use a water soluble coolant.
· When cutting an interrupted surface or a casted skin, the feed per tooth (fz) should be reduced to the lower recommended value shown in the above table.
· Cutting conditions are limited by machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

APPLICATION RANGE



Designation	Tool dia. øDc	Chipbreaker	Max. depth of cut ap	Max. ramping angle θ°	Max. plunging depth A	Min. machining øD1	Max. machining øD2	Max. machining øD3*	Max. cutting width in enlarging ae
E/HPO07R012…	12	MJ	7	8	0.5	16	23	20.5	11.5
E/HPO07R016…	16	MJ	7	5	0.5	24	31	28.5	15.5
EPO07R018...	18	MJ	7	4	0.5	28	35	32.5	17.5
E/HPO07R020...	20	MJ	7	3.5	0.5	32	39	36.5	19.5
EPO07R022...	22	MJ	7	3	0.5	36	43	40.5	21.5
E/HPO07R025...	25	MJ	7	2.5	0.5	42	49	46.5	24.5
EPO07R028...	28	MJ	7	2	0.5	48	55	52.5	27.5
TPO07R032…	32	MJ	7	1.8	0.5	56	63	60.5	31.5
TPO07R040	40	MJ	7	1.2	0.5	72	79	76.5	39.5
TPO07R050…	50	MJ	7	0.9	0.5	92	99	96.5	49.5
E/HPO07R012…	12	AJ	6.4	8	0.5	16	23	20.5	11.5
E/HPO07R016…	16	AJ	6.4	5	0.5	24	31	28.5	15.5
EPO07R018...	18	AJ	6.4	4	0.5	28	35	32.5	17.5
E/HPO07R020...	20	AJ	6.4	3.5	0.5	32	39	36.5	19.5
EPO07R022...	22	AJ	6.4	3	0.5	36	43	40.5	21.5
E/HPO07R025...	25	AJ	6.4	2.5	0.5	42	49	46.5	24.5
EPO07R028...	28	AJ	6.4	2	0.5	48	55	52.5	27.5
TPO07R032…	32	AJ	6.4	1.8	0.5	56	63	60.5	31.5
TPO07R040	40	AJ	6.4	1.2	0.5	72	79	76.5	39.5
TPO07R050…	50	AJ	6.4	0.9	0.5	92	99	96.5	49.5
E/HPO07R012…	12.6	HJ	0.8	5	0.5	17	24	-	9.6
E/HPO07R016…	16.6	HJ	0.8	3	0.5	25	32	-	13.6
EPO07R018...	18.6	HJ	0.8	2.5	0.5	29	36	-	15.6
E/HPO07R020...	20.6	HJ	0.8	2.1	0.5	33	40	-	17.6
EPO07R022...	22.6	HJ	0.8	1.9	0.5	37	44	-	19.6
E/HPO07R025...	25.6	HJ	0.8	1.6	0.5	43	50	-	22.6
EPO07R028...	28.6	HJ	0.8	1.3	0.5	49	56	-	25.6
TPO07R032…	32.6	HJ	0.8	1.1	0.5	57	64	-	29.6
TPO07R040	40.6	HJ	0.8	0.8	0.5	73	80	-	37.6
TPO07R050…	50.6	HJ	0.8	0.6	0.5	93	100	-	47.6
EPO11R012…	12	MJ, MS, AJ	10.6	6	0.5	15	23	21	11.5
EPO11R016…	16	MJ, MS, AJ	10.6	5	0.5	20	31	29	15.5
EPO11R018…	18	MJ, MS, AJ	10.6	4	0.5	26	35	33	17.5
E/HPO11R020…	20	MJ, MS, AJ	10.6	3	0.5	28	39	37	19.5
EPO11R022...	22	MJ, MS, AJ	10.6	2.5	0.5	31	43	41	21.5

Designation	Tool-ø øDc	Chipbreaker	Max. depth of cut ap	Max. ramping angle θ°	Max. plunging depth A	Min. machining øD1	Max. machining øD2	Max. machining øD3*	Max. cutting width in enlarging ae
E/HPO11R025…	25	MJ, MS, AJ	10.6	2	0.5	38	49	47	24.5
EPO11R028...	28	MJ, MS, AJ	10.6	1.5	0.5	42	53	51	27.5
EPO11R030…	30	MJ, MS, AJ	10.6	1.5	0.5	48	55	53	29.5
E/HPO11R032…	32	MJ, MS, AJ	10.6	1.5	0.5	52	59	57	31.5
EPO11R035…	35	MJ, MS, AJ	10.6	1	0.5	56	67	65	34.5
E/TPO11R040…	40	MJ, MS, AJ	10.6	1	0.5	68	79	77	39.5
TPO11R050…	50	MJ, MS, AJ	10.6	0.7	0.5	68	99	97	49.5
TPO11R063…	63	MJ, MS, AJ	10.6	0.5	0.5	114	125	123	62.5
TPO11R080…	80	MJ, MS, AJ	10.6	0.4	0.5	148	159	157	79.5
TPO11R100…	100	MJ, MS, AJ	10.6	0.3	0.5	188	199	197	99.5
EPO18R025...	25	MJ, AJ	16.7	6	1	32	48	44	24
EPO18R028...	28	MJ, AJ	16.7	4.5	1	38	54	50	27
EPO18R030…	30	MJ, AJ	16.7	4	1	42	58	54	29
EPO18R032…	32	MJ, AJ	16.7	3.5	1	46	62	58	31
EPO18R035…	35	MJ, AJ	16.7	3	1	52	68	64	34
E/TPO18R040…	40	MJ, AJ	16.7	2.5	1	62	78	74	39
E/TPO18R050…	50	MJ, AJ	16.7	1.9	1	82	98	94	49
E/TPO18R063	63	MJ, AJ	16.7	1.4	1	108	124	120	62
TPO18R080…	80	MJ, AJ	16.7	1	1	142	158	154	79
TPO18R100…	100	MJ, AJ	16.7	0.8	1	182	198	194	99
TPO18R125…	125	MJ, AJ	16.7	0.6	1	232	248	244	124
TPO18R160…	160	MJ, AJ	16.7	0.4	1	302	318	314	159

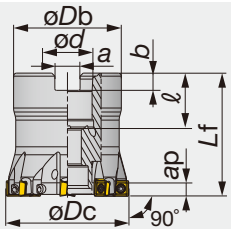
*Flat bottom hole
Note: Corner r_ε for dimensions of $øD_1$, $øD_2$, and $øD_3$: r_ε = 0.4 for EPO07 / EPO11 and r_ε = 0.8 for EPO18.

TUNGQUAD

TPD05

Highly dense square shoulder mills with small SDMT/SDHT05 inserts

A.R. = +5°, R.R. = -7° ~ +12°



Right hand (R) shown.

Designation	Max. ap	øDc	z	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TPD05R032M16.0E06	4	32	6	30	32	16	20	8.4	5.6	0.1	with	SD*T0502...
TPD05R040M22.0E08	4	40	8	38	40	22	22	10.4	6.3	0.2	with	SD*T0502...

SPARE PARTS

Designation	Clamping screw	Center bolt	Wrench
TPD05R032M16.0E06	CSPB-2L043	CM8X30H	IP-6DB
TPD05R040M22.0E08	CSPB-2L043	CM10X30H	IP-6DB

EPD05

Highly dense square shoulder endmills with small SDMT/SDHT05 inserts

A.R. = +5°, R.R. = -7° ~ +12°

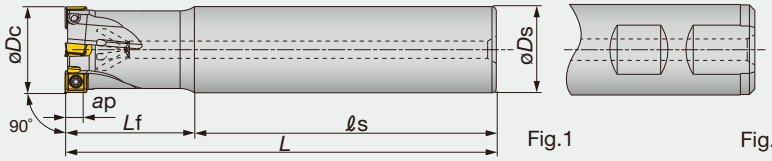


Fig.1 Fig.2

Right hand (R) shown.

Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Shank	Insert	Shank type
EPD05R012M12.0-02	4	12	2	12	62	18	80	0.1	with	Straight	SD*T0502...	Fig.1
EPD05R016M16.0-03	4	16	3	16	90	20	110	0.2	with	Straight	SD*T0502...	Fig.1
EPD05R020M20.0W04	4	20	4	20	80	25	105	0.2	with	Weldon	SD*T0502...	Fig.2
EPD05R025M20.0W05	4	25	5	20	90	25	115	0.3	with	Weldon	SD*T0502...	Fig.2
EPD05R032M25.0W06	4	32	6	25	98	32	130	0.5	with	Weldon	SD*T0502...	Fig.2
EPD05R040M32.0W08	4	40	8	32	100	40	140	0.8	with	Weldon	SD*T0502...	Fig.2

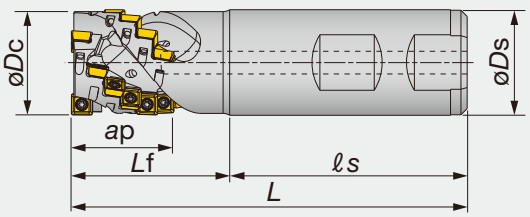
SPARE PARTS

Designation	Clamping screw	Wrench
EPD05...	CSPB-2L043	IP-6DB

ELD05

Highly dense square shoulder endmills for roughing with small SDMT/SDHT05 inserts

A.R. = +5°, R.R. = -3°



Designation	Max. ap	øDc	Z eff	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
ELD05R020M20.0W02	20.3	20	2	10	20	53	32	85	0.2	with	SD*T0502...
ELD05R025M25.0W03	24.2	25	3	18	25	59	36	95	0.3	with	SD*T0502...

SPARE PARTS

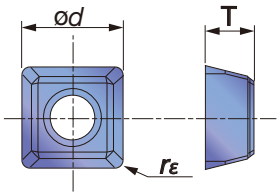
Designation	Clamping screw	Wrench
ELD05...	CSPB-2L043	IP-6DB

Reference pages

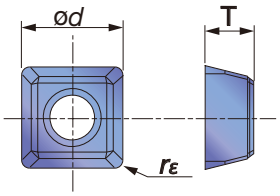
Inserts → **D071**, Standard cutting conditions → **D071 - D072**

INSERT

SDMT05-MJ



SDHT05-AJ



		AH140	AH725	TH10
P	Steel		★	
M	Stainless	★	☆	
K	Cast iron		★	
N	Non-ferrous			★
S	Superalloys		★	
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH140	Coated AH725	Un-coated TH10	T	ød
SDMT050204PN-MJ	0.4	4	●	●		2.38	5.09
SDHT050204FN-AJ	0.4	4			●	2.39	5.09

●: Line up

STANDARD CUTTING CONDITIONS

■ Bore, shank type TPD05/EPD05

ISO	Workpiece material	Brinell hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels C15E4, etc.	~ 200	AH725	230 - 320	0.04 - 0.1
	High carbon steels C45, etc.	200 ~ 300	AH725	150 - 230	0.04 - 0.1
	Alloyed steels 42CrMo4, etc.	150 ~ 300	AH725	150 - 230	0.04 - 0.1
	Tool steels X153CrMoV12, etc.	~ 300	AH725	110 - 130	0.03 - 0.09
M	Stainless steels X5CrNi18-9, etc.	-	AH140	100 - 200	0.03 - 0.09
K	Grey cast irons 250, etc.	150 ~ 250	AH725	200 - 300	0.05 - 0.12
	Ductile cast irons 450-10S, etc.	150 ~ 250	AH725	160 - 240	0.05 - 0.12
N	Aluminium alloys Si < 13%	-	TH10	350 - 500	0.05 - 0.15
	Aluminium alloys Si ≥ 13%	-	TH10	100 - 200	0.05 - 0.15
S	Titanium alloys Ti-6Al-4V, etc.	-	AH725	30 - 60	0.03 - 0.09
	Heat-resistant alloys Inconel 718, etc.	-	AH725	10 - 40	0.03 - 0.07

* For deep and wide cutting, set the *Vc* and *fz* to the lower recommended limits and check the vibration and spindle load of the machine.

STANDARD CUTTING CONDITIONS

Roughing type ELD05

ISO	Workpiece material	Brinell hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels C15E4, etc.	~ 200	AH725	100 - 250	0.04 - 0.1
	High carbon steels C45, etc.	200 ~ 300	AH725	100 - 200	0.04 - 0.1
	Alloyed steels 42CrMo4, etc.	150 ~ 300	AH725	100 - 200	0.04 - 0.1
	Tool steels X153CrMoV12, etc.	~ 300	AH725	100 - 130	0.03 - 0.09
M	Stainless steels X5CrNi18-9, etc.	-	AH140	100 - 150	0.03 - 0.09
K	Grey cast irons 250, etc.	150 ~ 250	AH725	100 - 250	0.05 - 0.12
	Ductile cast irons 450-10S, etc.	150 ~ 250	AH725	80 - 200	0.05 - 0.12
N	Aluminium alloys Si < 13%	-	TH10	200 - 500	0.05 - 0.15
	Aluminium alloys Si ≥ 13%	-	TH10	100 - 200	0.05 - 0.15
S	Titanium alloys Ti-6Al-4V, etc.	-	AH725	30 - 60	0.03 - 0.09
	Heat-resistant alloys Inconel 718, etc.	-	AH725	10 - 40	0.03 - 0.07

MEMO

TPW13

Square shoulder mills with screw clamped SWMT/SWGT13 inserts

A.R. = +11.5°, R.R. = -13° ~ -10.5°

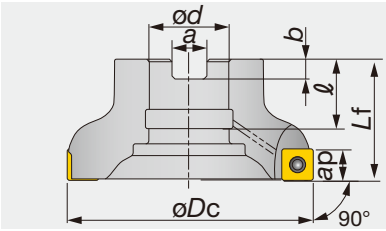


Fig.1

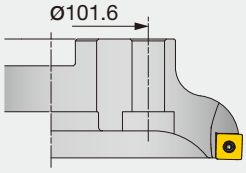


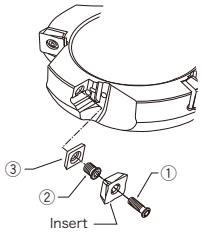
Fig.2

Right hand (R) shown.

Designation	Max. ap	øDc	z	Lf	ød	ℓ	a	b	Kg	Airhole	Insert	Style
TPW13R050M22.0E04	10	50	4	40	22	20	10.4	6.3	0.3	with	SW*T1304...	1
TPW13R050M22.0E05	10	50	5	40	22	20	10.4	6.3	0.3	with	SW*T1304...	1
TPW13R063M22.0E05	10	63	5	40	22	20	10.4	6.3	0.4	with	SW*T1304...	1
TPW13R063M22.0E06	10	63	6	40	22	20	10.4	6.3	0.4	with	SW*T1304...	1
TPW13R080M27.0E06	10	80	6	50	27	22	12.4	7	0.8	with	SW*T1304...	1
TPW13R080M27.0E08	10	80	8	50	27	22	12.4	7	0.8	with	SW*T1304...	1
TPW13R100M32.0E07	10	100	7	50	32	28.5	14.4	8	1.2	with	SW*T1304...	1
TPW13R100M32.0E10	10	100	10	50	32	28.5	14.4	8	1.2	with	SW*T1304...	1
TPW13R125M40.0E08	10	125	8	63	40	32	16.4	9	2.4	with	SW*T1304...	1
TPW13R125M40.0E12	10	125	12	63	40	32	16.4	9	2.5	with	SW*T1304...	1

SPARE PARTS

Designation	①Clamping screw	Lubricant	②Shim screw	Center bolt	Center bolt 1	③Shim	Wrench for ①	Wrench for ②
TPW13R050, 063...	CSPB-3.5	M-1000	DTS5-3.5SS	-	CM10X30H	FSSP1102	IP-15D	P-3.5
TPW13R080M...	CSPB-3.5	M-1000	DTS5-3.5SS	-	CM12X30H	FSSP1102	IP-15D	P-3.5
TPW13R100M...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-M16H	-	FSSP1102	IP-15D	P-3.5
TPW13R125M...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-M20H	-	FSSP1102	IP-15D	P-3.5



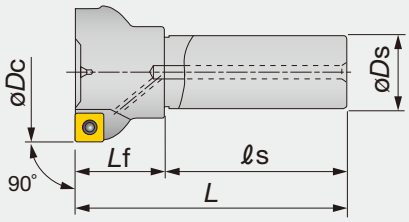
Reference pages

Inserts → **D076**, Standard cutting conditions → **D077**

EPW13

Square shoulder endmills with screw clamped SWMT/SWGT13 inserts

A.R. = +11.5°, R.R. = -13° ~ -10.5°

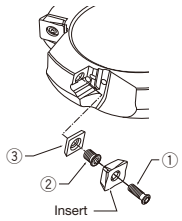


Right hand (R) shown.

Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EPW13R032M32.0-02	10	32	2	32	80	35	115	0.6	with	SW*T1304...
EPW13R040M32.0-03	10	40	3	32	80	35	115	0.7	with	SW*T1304...
EPW13R050M32.0-03	10	50	3	32	80	40	120	0.9	with	SW*T1304...
EPW13R050M32.0-04	10	50	4	32	80	40	120	0.9	with	SW*T1304...
EPW13R063M32.0-04	10	63	4	32	80	40	120	1	with	SW*T1304...
EPW13R063M32.0-05	10	63	5	32	80	40	120	1	with	SW*T1304...
EPW13R080M32.0-04	10	80	4	32	80	40	120	1.3	with	SW*T1304...
EPW13R080M32.0-06	10	80	6	32	80	40	120	0.8	with	SW*T1304...

SPARE PARTS

Designation	①Clamping screw	Lubricant	②Shim screw	③Shim	Wrench for ①	Wrench for ②
EPW13R032, 040...	CSPB-3.5	M-1000	-	-	IP-15D	-
EPW13R050 - 080...	CSPB-3.5	M-1000	DTS5-3.5SS	FSSP1102	IP-15D	P-3.5

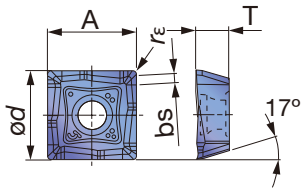


Reference pages

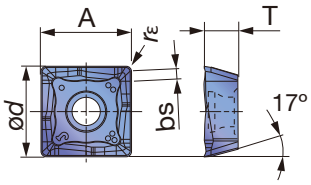
Inserts → **D076**, Standard cutting conditions → **D077**

INSERT

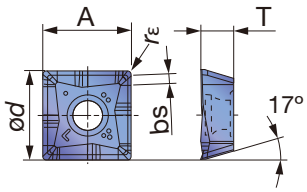
SWGT1304-MJ



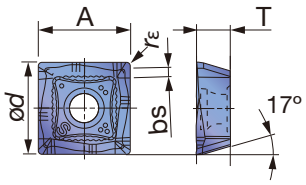
SWMT1304-MJ



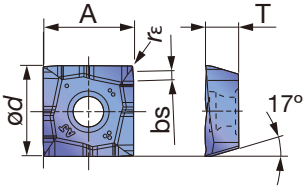
SWMT1304-ML



SWMT1304-MS



SWGT1304-AJ



		AH120	AH130	AH140	T1115	T1215	T3130	DS1100	NS740	KS05F
P	Steel	★	☆	☆			☆		☆	
M	Stainless	☆	★	★						
K	Cast iron	☆				★				
N	Non-ferrous							★		★
S	Superalloys									
H	Hard materials									

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated							Cermet	Un-coated	A	ød	T	bs
			AH120	AH130	AH140	T1115	T1215	T3130	DS1100	NS740	KS05F				
SWGT1304PDPR-MJ	0.8	10	●							●		13.6	13.6	5	1.4
SWMT1304PDPR-MJ	0.8	10	●	●	●	●	●	●		●		13.6	13.6	5	1.4
SWMT1304PDER-ML	0.8	10	●	●								13.6	13.6	5	1.4
SWMT1304PDPR-MS	0.8	10		●	●							13.6	13.6	5	1.4
SWGT1304PDFR-AJ	0	10							●		●	13.6	13.6	5	1.6

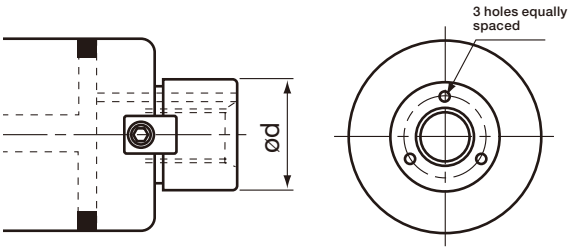
●: Line up

STANDARD CUTTING CONDITIONS TPW / EPW13 TYPE

ISO	Workpiece material	Recommended insert grade	Cutting speed Vc (m/min)	Roughing (Depth of cut: ap ≥ 1.0 mm) Feed per tooth: *fz* (mm/t)				Light cutting to finishing (Depth of cut: ap ≥ 1.0 mm) Feed per tooth: *fz* (mm/t)			
				MJ	ML	MS	AJ	MJ	ML	MS	AJ
P	Mild steels Low carbon steels < 180HB	AH120 (First choice)	100 - 270	0.05 - 0.25	0.05 - 0.2	-	-	0.05 - 0.2	0.05 - 0.18	-	-
		T3130 (Priority on wear resistance)	150 - 300	0.05 - 0.25	-	-	-	0.05 - 0.2	-	-	-
		AH130 / AH140 (Priority on impact resistance)	80 - 180	0.05 - 0.25	-	0.05 - 0.2	-	0.05 - 0.2	-	0.05 - 0.18	-
		NS740 (Priority on surface finish)	100 - 300	0.05 - 0.15	-	-	-	0.05 - 0.12	-	-	-
	Carbon steels Alloy steels < 300HB	AH120 (First choice)	100 - 230	0.05 - 0.2	0.05 - 0.15	-	-	0.05 - 0.18	0.05 - 0.12	-	-
		T3130 (Priority on wear resistance)	150 - 280	0.05 - 0.2	-	-	-	0.05 - 0.18	-	-	-
		AH130 / AH140 (Priority on impact resistance)	80 - 150	0.05 - 0.2	-	-	-	0.05 - 0.18	-	-	-
		NS740 (Priority on surface finish)	100 - 230	0.05 - 0.15	-	-	-	0.05 - 0.12	-	-	-
	Die steels < 30HRC	AH120 (First choice)	100 - 180	0.05 - 0.15	0.05 - 0.12	-	-	0.05 - 0.12	0.05 - 0.1	-	-
		T3130 (Priority on wear resistance)	100 - 180	0.05 - 0.15	-	-	-	0.05 - 0.12	-	-	-
M	Stainless steels < 50HB	AH130 / AH140 (First choice)	80 - 200	0.05 - 0.2	-	0.05 - 0.18	-	0.05 - 0.18	-	0.05 - 0.15	-
		AH120 (Priority on wear resistance)	150 - 250	0.05 - 0.2	0.05 - 0.15	-	-	0.05 - 0.18	0.05 - 0.12	-	-
K	Grey cast irons Ductile cast irons	T1215 (First choice)	100 - 250	0.05 - 0.2	-	-	-	0.05 - 0.18	-	-	-
		AH120 (Priority on impact resistance)	100 - 250	0.05 - 0.2	0.05 - 0.15	-	-	0.05 - 0.18	0.05 - 0.12	-	-
N	Aluminium alloys Si < 13 %	DS1100 / KS05F (First choice)	300 - 1000	-	-	-	0.05 - 0.2	-	-	-	0.05 - 0.2
	Aluminium alloys Si ≥ 13 %	DS1100 / KS05F (First choice)	80 - 300	-	-	-	0.05 - 0.2	-	-	-	0.05 - 0.2
	Copper alloys	DS1100 / KS05F (First choice)	200 - 500	-	-	-	0.05 - 0.2	-	-	-	0.05 - 0.2

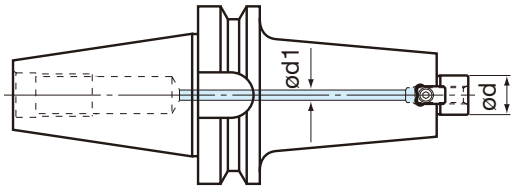
Notes:
- When machining at large depth of cut or large cutting width, *Vc* and *fz* should be reduced.
- As a rule, dry machining (including air blow) is recommended. But, for excessive chip welding, such as when machining stainless steels, use a water soluble cutting fluid. In this case, use AH140 and set the cutting speed to *Vc* ≤ 100 m/min.
- When machining mild steel, carbon steel or alloy steel in wet conditions the T3130 is recommended. In this case, *Vc* and *fz* should be reduced.
- TPW13 type can not be used for ramping, plunging and drilling.

Face mill arbors with center through-coolant hole



Cutter diameter *øD* (mm)	50/63	80	100	125	160
Nominal diameter *ød* (mm)	22	25.4	31.75	38.1	50.8
Arbor type	FMH22	FMH25.4	FMH31.75	FMH38.1	FMH50.8

Notes on arbors: when using TAW13 or TPW13 type, use through center air.



Nominal diameter *ød* (mm)	16	22	25.4	31.75	38.1	50.8
Applicable arbor types	SMA SM1	FMC SM1	FMA FMC	FMA SMB	FMA	FMA
Through hole diameter *ød*1 (mm)	4 ~ 6	5 ~ 8	6 ~ 9	10 ~ 13	10 ~ 15	10 ~ 15

When using the TAW13 or TPW13 type with through center air (coolant or mist), the correct arbor must be used with through center air supplying.

■ Cautionary notes in use

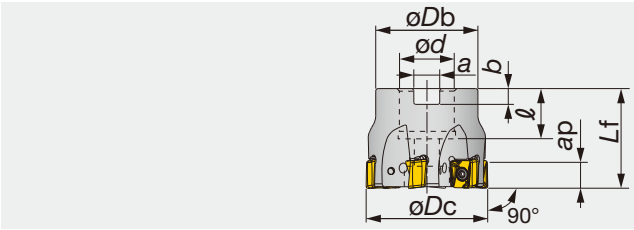
● In slotting or pocketing, when chips are likely to remain in the cutting zone, internal air supplying or air blow is recommended to prevent chip recutting.
● Use of inserts other than those specified, can result in poor cutting and cause damage to the cutter body. Therefore, specified inserts from the Tungaloy catalogue must be used.
● Before changing or indexing the inserts, remove chips or other foreign matter from the insert, insert pocket and cutter body by using an air blast or cloth.
● The inserts should be clamped by using the wrench supplied with the TAC Mill.
● After a long period of use, the clamping screws and wrench may become deformed or damaged. These elements must be replaced as soon as possible.

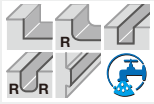
MEMO

TPQ11,18

Square shoulder mills with LQMU type double sided tough inserts with 4 edges

A.R. = +4° ~ +5°, R.R. = +13° ~ +15°





Right hand (R) shown.

Designation	Max. ap	øDc	z	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TPQ11R040M16.0E04	9	40	4	35	40	16	20	8.4	5.6	0.2	with	LQMU1107...
TPQ11R050M22.0E06	9	50	6	41	40	22	20	10.4	6.3	0.4	with	LQMU1107...
TPQ11R063M22.0E07	9	63	7	47	40	22	20	10.4	6.3	0.5	with	LQMU1107...
TPQ11R080M27.0E10	9	80	10	58	50	27	26	12.4	7	1	with	LQMU1107...
TPQ11R100M32.0E12	9	100	12	66	50	32	32	14.4	8	1.6	with	LQMU1107...
TPQ18R050M22.0E03	14	50	3	47	40	22	20	10.4	6.3	0.4	with	LQMU1808...
TPQ18R063M27.0E04	16	63	4	58	50	27	26	12.4	7	0.5	with	LQMU1808...
TPQ18R080M27.0E05	16	80	5	58	50	27	26	12.4	7	0.9	with	LQMU1808...
TPQ18R100M32.0E06	16	100	6	66	50	32	32	14.4	8	1.4	with	LQMU1808...
TPQ18R125M40.0E08	16	125	8	82	63	40	38	16.4	9	2.9	with	LQMU1808...
TPQ18R160M40.0E09	16	160	9	100	63	40	38	16.4	9	4.1	without	LQMU1808...

SPARE PARTS

Designation	Clamping screw	Grip	Grip 1	Torx bit	Center bolt
TPQ11R040M16.0E04	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM8×30H
TPQ11R050M22.0E06	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM10×30H
TPQ11R063M22.0E07	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM10×30H
TPQ11R080M27.0E10	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	CM12×30H
TPQ11R100M32.0E12	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	TMBA-M16H
TPQ18R050M22.0E03	SR14-591	-	H-TB	BT20M	CM10×30H
TPQ18R063M27.0E04	SR14-591	-	H-TB	BT20M	CM12×30H
TPQ18R080M27.0E05	SR14-591	-	H-TB	BT20M	CM12×30H
TPQ18R100M32.0E06	SR14-591	-	H-TB	BT20M	TMBA-M16H
TPQ18R125M40.0E08	SR14-591	-	H-TB	BT20M	TMBA-M20H
TPQ18R160M40.0E09	SR14-591	-	H-TB	BT20M	-

Reference pages

Inserts → **D081**, Standard cutting conditions → **D082**

EPQ11,18

Square shoulder endmills with LQMU type double sided tough inserts with 4 edges

A.R. = +4° ~ +5°, R.R. = +13° ~ +15°

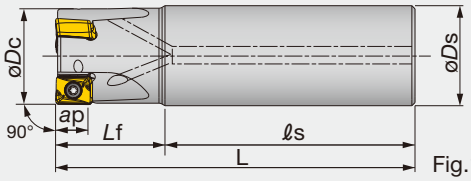


Fig.1

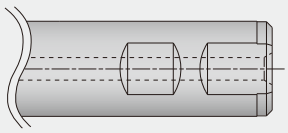
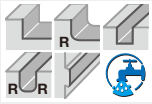


Fig.2



Right hand (R) shown.

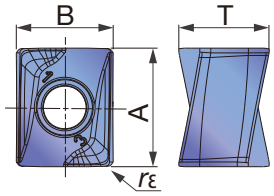
Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert	Shank style
EPQ11R025M25.0-02	9	25	2	25	70	30	100	0.3	with	LQMU1107...	Fig.1
EPQ11R032M32.0-03	9	32	3	32	80	35	115	0.7	with	LQMU1107...	Fig.1
EPQ11R040M32.0-04	9	40	4	32	80	35	115	0.8	with	LQMU1107...	Fig.1
EPQ11R050M32.0-05	9	50	5	32	80	40	120	0.9	with	LQMU1107...	Fig.1
EPQ11R063M32.0-06	9	63	6	32	80	40	120	1.1	with	LQMU1107...	Fig.1
EPQ11R080M32.0-07	9	80	7	32	80	40	120	1.4	with	LQMU1107...	Fig.1
EPQ18R040M32.0W03	14	40	3	32	75	35	110	0.7	with	LQMU1808...	Fig.2
EPQ18R050M32.0W04	14	50	4	32	75	40	115	0.9	with	LQMU1808...	Fig.2

SPARE PARTS

Designation	Clamping screw	Grip	Grip 1	Torx bit	Wrench
EPQ11...	CSTB-3.5L115	SW6-SD	-	BLDT10/S7	T-10D
EPQ18...	SR14-591	-	H-TB	BT20M	T-20D

INSERT

LQMU11/18-MJ



P	Steel	☆		★
M	Stainless		★	☆
K	Cast iron	★		☆
N	Non-ferrous			
S	Superalloys	★		★
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	AH140	AH725	A	T	B
LQMU110704PNER-MJ	0.4	9	●	●	●	11	8.3	9
LQMU110708PNER-MJ	0.8	9	●	●	●	11	8.3	9
LQMU110716PNER-MJ	1.6	9	●	●	●	11	8.3	9
LQMU110720PNER-MJ	2	9	●			11	8.3	9
LQMU180804PNER-MJ	0.4	16	●	●	●	17.5	10.9	11.5
LQMU180808PNER-MJ	0.8	16	●	●	●	17.5	10.9	11.5
LQMU180816PNER-MJ	1.6	16	●	●	●	17.5	10.9	11.5
LQMU180824PNER-MJ	2.4	16	●	●	●	17.5	10.9	11.5

●: Line up

Reference pages

Standard cutting conditions → **D082**

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel C15E, etc.	- 200	AH725	100 - 250	0.1 - 0.25
	High carbon steel C45, C55, etc.	200 - 300	AH725	100 - 230	0.1 - 0.2
	Alloy steel 42CrMo4, etc.	150 - 300	AH725	100 - 230	0.1 - 0.2
	Tool steel X153CrMoV12, etc.	- 300	AH725	100 - 180	0.1 - 0.2
M	Stainless steel X5CrNi18-9, etc.	-	AH140	90 - 180	0.1 - 0.25
K	Grey cast iron 250, etc.	150 - 250	AH120	140 - 250	0.1 - 0.25
	Ductile cast iron 450-10S, etc.	150 - 250	AH120	110 - 200	0.1 - 0.25
S	Superalloys Inconel 718, Ti-6Al-4V, etc.	-	AH725	20 - 50	0.08 - 0.2

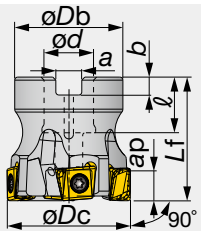
· To remove excessive chip accumulation use an air blast.
· When cutting an interrupted surface or a casted skin, the feed per tooth (*fz*) should be reduced to the lower recommended value shown in the above table.
· Cutting conditions are limited by machine power, work piece rigidity and spindle output. When the cutting width, depth or over hang length is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

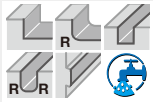
TECMILL

TPM11,16

Square shoulder mills with LMMU type tangential clamped insert with 4 edges

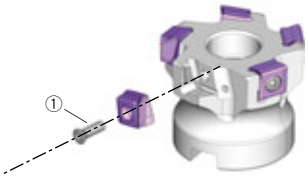
A.R. = +5° ~ +6°, R.R. = +9° ~ +13°





Right hand (R) shown.

Designation	Max. ap	øDc	z	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TPM11R050M22.0E05	9.7	50	5	41	40	22	20	10.4	6.3	0.3	with	LMMU1107...
TPM11R063M22.0E06	9.7	63	6	41	40	22	20	10.4	6.3	0.5	with	LMMU1107...
TPM11R080M27.0E07	9.7	80	7	50	50	27	22	12.4	7	1	with	LMMU1107...
TPM11R080M27.0E09	9.7	80	9	50	50	27	22	12.4	7	1	with	LMMU1107...
TPM11R100M32.0E08	9.7	100	8	60	50	32	28.5	14.4	8	1.4	with	LMMU1107...
TPM11R100M32.0E11	9.7	100	11	60	50	32	28.5	14.4	8	1.5	with	LMMU1107...
TPM16R080M27.0E05	15.1	80	5	50	50	27	22	12.4	7	1	with	LMMU1609...
TPM16R100M32.0E06	15.1	100	6	60	50	32	28.5	14.4	8	1.5	with	LMMU1609...
TPM16R125M40.0E07	15.1	125	7	71	63	40	32	16.4	9	2.7	with	LMMU1609...



SPARE PARTS

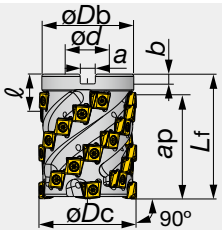
Designation	①Clamping screw	Grip	Center bolt	Center bolt 1	Torx bit
TPM11R050, 063...	CSTB-3.5L110	H-TB	-	CM10X30H	BT15S
TPM11R080M...	CSTB-3.5L110	H-TB	-	CM12X30H	BT15S
TPM11R100M...	CSTB-3.5L110	H-TB	TMBA-M16H	-	BT15S
TPM16R080M27.0E05	CSTB-5L159	H-TB	-	CM12X30H	BT20S
TPM16R100M32.0E06	CSTB-5L159	H-TB	TMBA-M16H	-	BT20S
TPM16R125M40.0E07	CSTB-5L159	H-TB	TMBA-M20H	-	BT20S

TECMILL

TLM11

Square shoulder mills for roughing with LMMU type tangential clamped insert with 4 edges

A.R. = +5° ~ +6°, R.R. = +9° ~ +13°



Designation	Max. ap	øDc	Z eff	z	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TLM11R050M22.0E03	58.5	50	3	21	47	70	22	20	10.4	6.3	0.8	with	LMMU1107...
TLM11R063M27.0E04	66.9	63	4	32	59	80	27	22	12.4	7	1.4	with	LMMU1107...

SPARE PARTS

Designation	Clamping screw	Grip	Center bolt	Torx bit
TLM11R050M22.0E03	SM35-114-H0	H-TB	SD06-A3	BT15S
TLM11R063M27.0E04	SM35-114-H0	H-TB	SD08-98	BT15S

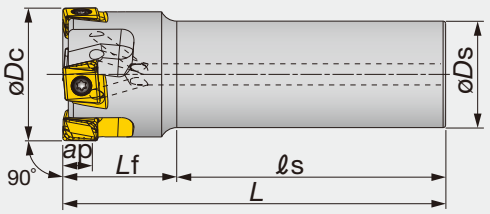
Reference pages

Inserts → **D084**, Standard cutting conditions → **D085**

EPM11

Square shoulder endmills with LMMU type tangential clamped insert with 4 edges

A.R. = +5° ~ +6°, R.R. = +9° ~ +13°



Right hand (R) shown.

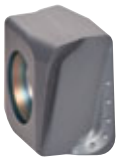
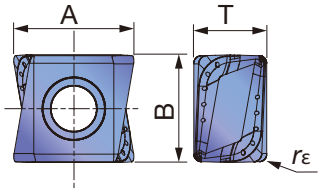
Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EPM11R032M32.0-03	9.7	32	3	32	80	35	115	0.6	with	LMMU1107...
EPM11R040M32.0-04	9.7	40	4	32	80	35	115	0.7	with	LMMU1107...
EPM11R050M32.0-04	9.7	50	4	32	80	40	120	0.9	with	LMMU1107...
EPM11R063M32.0-06	9.7	63	6	32	80	40	120	1.2	with	LMMU1107...
EPM11R080M32.0-07	9.7	80	7	32	80	40	120	1.6	with	LMMU1107...

SPARE PARTS

Designation	Clamping screw	Wrench
EPM11...	CSTB-3.5L110	T-15DB

INSERT

LMMU11/16-MJ

P	Steel	☆		★		☆	
M	Stainless		★	☆			
K	Cast iron	★		☆	☆		
N	Non-ferrous						
S	Superalloys	★		★			
H	Hard materials						

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	AH140	AH725	T1115	T3130	A	B	T
LMMU110708PNER-MJ	0.8	9.7	●	●	●	●	●	11.7	10.5	7.1
LMMU110716PNER-MJ	1.6	9.7	●	●	●	●	●	11.5	10.5	7.1
LMMU110724PNER-MJ	2.4	9.7	●	●	●	●	●	11.3	10.5	7.1
LMMU110732PNER-MJ	3.2	9.7	●	●	●	●	●	11.1	10.5	7.1
LMMU160908PNER-MJ	0.8	15.1	●	●	●	●	●	17.3	16	9.5
LMMU160916PNER-MJ	1.6	15.1	●	●	●	●	●	17.1	16	9.5
LMMU160924PNER-MJ	2.4	15.1	●	●	●	●		16.9	16	9.5
LMMU160932PNER-MJ	3.2	15.1	●	●	●	●		16.8	16	9.5

●: Line up

Reference pages

Standard cutting conditions → **D085**

STANDARD CUTTING CONDITIONS

TPM11, 16 / EPM11

ISO	Workpiece materials	Brinell hardness HB	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels C15E4 etc.	- 200	First choice	AH725	100 - 250	0.12 - 0.3
		- 200	For impact resistance	AH140	80 - 180	0.12 - 0.3
		- 200	For wear resistance	T3130	120 - 250	0.12 - 0.3
	High carbon steels C45 etc.	200 - 300	First choice	AH725	100 - 230	0.12 - 0.25
		200 - 300	For impact resistance	AH140	80 - 180	0.12 - 0.25
		200 - 300	For wear resistance	T3130	120 - 250	0.12 - 0.25
	Alloyed steels 42CrMo4 etc.	150 - 300	First choice	AH725	100 - 230	0.12 - 0.25
		150 - 300	For impact resistance	AH140	80 - 150	0.12 - 0.25
		150 - 300	For wear resistance	T3130	120 - 250	0.12 - 0.25
	Tool steels X40CrMoV5-1 etc.	- 300	First choice	AH725	100 - 180	0.12 - 0.25
		- 300	For impact resistance	AH140	80 - 120	0.12 - 0.25
		- 300	For wear resistance	T3130	100 - 180	0.12 - 0.25
M	Stainless steels X5CrNi18-9 etc.	-	First choice	AH140	90 - 180	0.12 - 0.3
K	Grey cast irons 250 etc.	150 - 250	First choice	AH120	140 - 250	0.12 - 0.3
		150 - 250	For wear resistance	T1115	140 - 250	0.12 - 0.3
	Ductile cast irons 450-10S etc.	150 - 250	First choice	AH120	110 - 200	0.12 - 0.3
		150 - 250	For wear resistance	T1115	110 - 200	0.12 - 0.3
S	Heat-resisting alloy Inconel 718 / Ti-6Al-4V etc.	-	First choice	AH725	20 - 50	0.1 - 0.2

· To remove excessive chip accumulation use an air blast.
· When cutting an interrupted surface or a casting skin, the feed (fz) should be reduced to the lower recommended value shown in the above table.
· Cutting conditions are limited by machine power, work piece rigidity and spindle output. When the cutting width, depth or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

TLM11

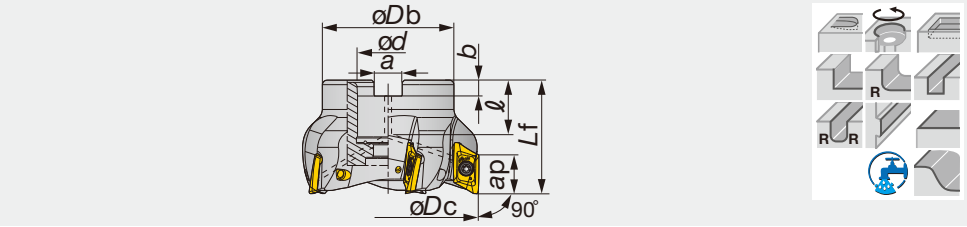
ISO	Workpiece materials	Brinell hardness HB	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels C15E4 etc.	- 200	First choice	AH725	100 - 250	0.10 - 0.23
		- 200	For impact resistance	AH140	80 - 180	0.10 - 0.23
		- 200	For wear resistance	T3130	100 - 250	0.10 - 0.23
	High carbon steels C45 etc.	200 - 300	First choice	AH725	100 - 200	0.08 - 0.21
		200 - 300	For impact resistance	AH140	80 - 150	0.08 - 0.21
		200 - 300	For wear resistance	T3130	100 - 200	0.08 - 0.21
	Alloyed steels 42CrMo4 etc.	150 - 300	First choice	AH725	100 - 200	0.08 - 0.21
		150 - 300	For impact resistance	AH140	80 - 150	0.08 - 0.21
		150 - 300	For wear resistance	T3130	100 - 200	0.08 - 0.21
	Tool steels X40CrMoV5-1 etc.	- 300	First choice	AH725	100 - 150	0.08 - 0.21
		- 300	For impact resistance	AH140	80 - 120	0.08 - 0.21
		- 300	For wear resistance	T3130	100 - 150	0.08 - 0.21
M	Stainless steels X5CrNi18-9 etc.	-	First choice	AH140	90 - 150	0.08 - 0.21
K	Grey cast irons 250 etc.	150 - 250	First choice	AH120	100 - 250	0.10 - 0.25
		150 - 250	For wear resistance	T1115	100 - 250	0.10 - 0.25
	Ductile cast irons 450-10S etc.	150 - 250	First choice	AH120	100 - 250	0.10 - 0.25
		150 - 250	For wear resistance	T1115	100 - 250	0.10 - 0.25
S	Heat-resisting alloy Inconel 718 / Ti-6Al-4V etc.	-	First choice	AH725	20 - 50	0.06 - 0.15

TUNG-ALUMILL

TPV16

90° shoulder milling shellmills with screw clamped XVCT16 inserts for aluminum machining

A.R. = +10° ~ +11°, R.R. = -9° ~ -5.5°



Designation	øDc	z	øDb	ød	ℓ	Lf	b	a	Kg	Air hole	Max. RPM (min^{-1})	Insert
TPV16R040M16.0E03	40	3	38	16	20	50	5.6	8.4	0.23	with	30,000	XVCT1605...
TPV16R050M22.0E04	50	4	45	22	22	50	6.3	10.4	0.33	with	27,000	XVCT1605...
TPV16R063M22.0E05	63	5	47	22	22	50	6.3	10.4	0.54	with	24,000	XVCT1605...
TPV16R080M27.0E05	80	5	58	27	28	50	7	12.4	0.86	with	21,000	XVCT1605...
TPV16R100M32.0E06	100	6	66	32	26	63	8	14.4	1.55	with	19,000	XVCT1605...
TPV16R125M40.0E07	125	7	85	40	32	63	9	16.4	2.53	with	17,000	XVCT1605...

SPARE PARTS

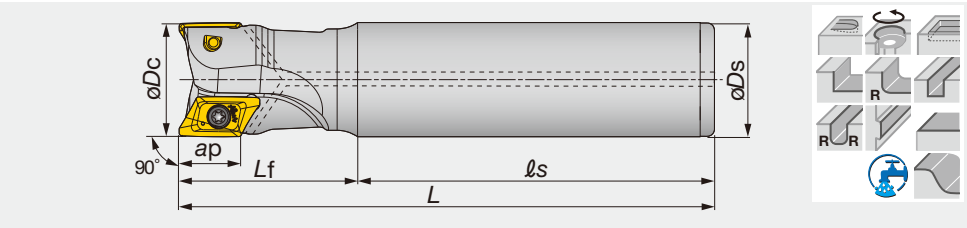
Designation	Clamping screw	Grip	Center bolt	Torx bit
TPV16R040M16.0E03	TS40093I/HG	H-TBS	SHM8X1.25X35-C	BT15S
TPV16R050 - 063...	TS40093I/HG	H-TBS	SHM10X1.5X30-C	BT15S
TPV16R080M27.0E05	TS40093I/HG	H-TBS	LHM12X1.75X30-C	BT15S
TPV16R100M32.0E06	TS40093I/HG	H-TBS	SHM16X2X35-C	BT15S
TPV16R125M40.0E07	TS40093I/HG	H-TBS	SHM20X2.5X40-C	BT15S

TUNG-ALUMILL

EPV16

90° endmills with screw clamped XVCT16 inserts for aluminum machining

A.R. = +6° ~ +10°, R.R. = -12° ~ -9°



Designation	øDc	z	øDs	ℓs	Lf	L	Kg	Air hole	Max. RPM (min^{-1})	Insert
EPV16R025M25.0-02	25	2	25	70	55	125	0.37	with	38,000	XVCT1605...
EPV16R025M25.0-02L	25	2	25	100	70	170	0.53	with	38,000	XVCT1605...
EPV16R032M32.0-02	32	2	32	100	50	150	0.77	with	34,000	XVCT1605...
EPV16R032M32.0-02L	32	2	32	120	80	200	1.03	with	34,000	XVCT1605...
EPV16R032M32.0-03	32	3	32	100	50	150	0.76	with	34,000	XVCT1605...
EPV16R032M32.0-03L	32	3	32	120	80	200	1.03	with	34,000	XVCT1605...
EPV16R040M32.0-03	40	3	32	120	50	170	0.94	with	30,000	XVCT1605...
EPV16R040M32.0-03L	40	3	32	195	55	250	1.43	with	30,000	XVCT1605...

SPARE PARTS

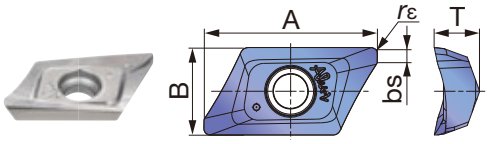
Designation	Clamping screw	Grip	Torx bit
EPV16R025M...	TS40085I/HG	H-TBS	BT15S
EPV16R032M...	TS40093I/HG	H-TBS	BT15S
EPV16R040M...	TS40093I/HG	H-TBS	BT15S

Reference pages

Inserts, Standard cutting conditions → **D087**

INSERT

XVCT16-AJ



P	Steel	
M	Stainless	
K	Cast iron	
N	Non-ferrous	★
S	Superalloys	
H	Hard materials	

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Un-coated TH10	A	B	T	bs
XVCT160504R-AJ	0.4	16	●	22.2	11.2	5.9	1.3
XVCT160508R-AJ	0.8	16	●	22.2	11.2	5.9	1
XVCT160512R-AJ	1.2	15.5	●	21.7	11.2	5.8	1
XVCT160516R-AJ	1.6	15	●	21.2	11.2	5.75	1
XVCT160520R-AJ	2	14.5	●	20.8	11.2	5.75	1
XVCT160530R-AJ	3	14	●	19.5	11.2	5.6	1
XVCT160532R-AJ	3.2	14	●	19.2	11.2	5.6	1
XVCT160540R-AJ	4	13	●	18.4	11.2	5.5	1.2
XVCT160550R-AJ	5	13	●	18.4	11.2	5.4	0.4

●: Line up

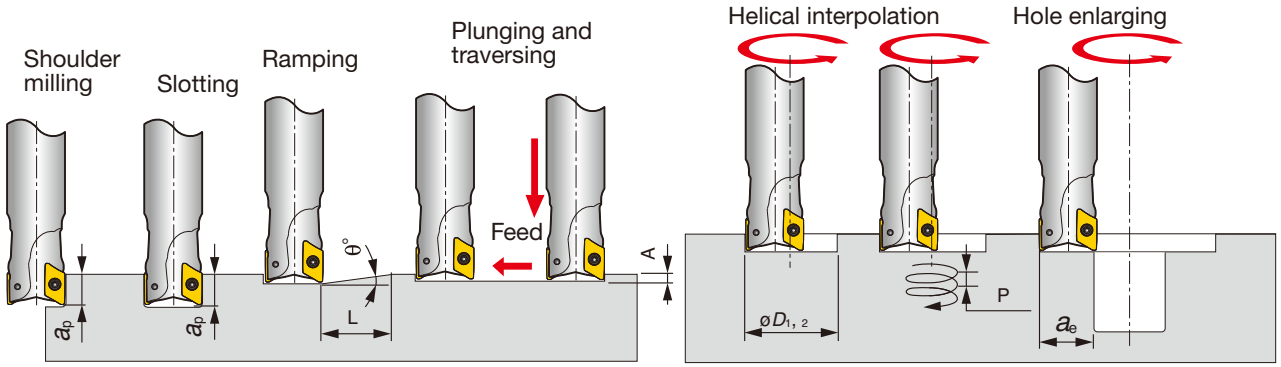
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness HB	Grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
N	Aluminium alloy	60	TH10	AJ	300 - 5000	0.15 - 0.35
		100	TH10	AJ	200 - 2000	0.1 - 0.25
	Cast aluminium alloy Si ≤ 12%	75	TH10	AJ	200 - 2000	0.15 - 0.3
		90	TH10	AJ	200 - 1500	0.1 - 0.25
	Cast aluminium alloy Si > 12%	130	TH10	AJ	200 - 1000	0.07 - 0.15
	Copper alloys Pb > 1%	110	TH10	AJ	200 - 800	0.07 - 0.15
	Copper alloys	90	TH10	AJ	300 - 1000	0.1 - 0.15
		100	TH10	AJ	300 - 800	0.1 - 0.15
	Duroplastics, fiber plastics	-	TH10	AJ	100 - 500	0.1 - 0.15
	Hard rubber	-	TH10	AJ	100 - 300	0.1 - 0.15

Safety guidelines

1. Use only the original inserts, cutters and spare parts.
2. Insert pocket must be cleaned before clamping the insert.
3. Clamp torque of screw should be 4.5 N·m.
4. For safety reasons, use a new screw when changing the insert.
5. Maximum RPM values are determined based on the burst test. Using RPM beyond maximum values may cause insert breakage, machine damage or personal injury.
6. XVCT insert has sharp cutting edges. Always wear gloves for protection from injury when handling.

APPLICATION RANGE



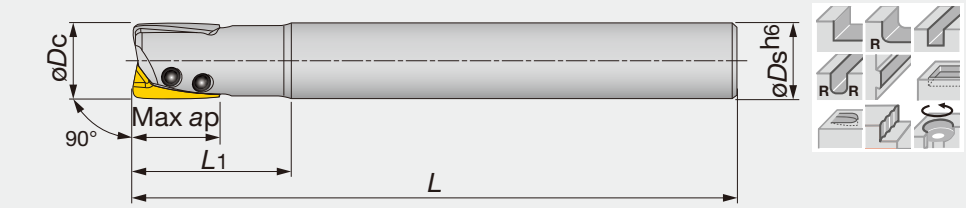
Designation	Tool øDc	Corner radius rε	Max. depth of cut ap	Straight ramp down: Max. ramping angle θ°	Straight ramp down: Min. length L	Step down: Max. plunging depth A	Helical ramp down: Min. machining øD1	Helical ramp down: Min. pitch/rev P	Helical ramp down: Max. machining øD2	Helical ramp down: Max. pitch/rev P	Hole enlarging: Max. width ae
EPV16R025...	25	0.4, 0.8	16	22	40	4.2	29.1	4.4	50	13.6	22.5
EPV16R025...	25	1.2	15.5	22	40	4.2	29.1	4.4	50	13.6	22.5
EPV16R025...	25	1.6	15	22	38	3.7	29.1	4.4	50	13.2	22.5
EPV16R025...	25	2	14.5	22	38	3.7	29.1	4.4	50	13.2	22.5
EPV16R025...	25	3, 3.2	14	21	38	2.5	29.1	4.2	50	12.3	22.5
EPV16R025...	25	4, 5	13	18.5	40	2.3	29.1	3.7	50	12.3	22.5
EPV16R032...	32	0.4, 0.8	16	16.5	54	4	43.1	8.8	64	13.6	28.8
EPV16R032...	32	1.2	15.5	16.5	54	4	43.1	8.8	64	13.6	28.8
EPV16R032...	32	1.6	15	16	54	3.5	43.1	8.5	64	13.2	28.8
EPV16R032...	32	2	14.5	16	54	3.5	43.1	8.5	64	13.2	28.8
EPV16R032...	32	3, 3.2	14	15	54	3	43.1	7.9	64	12.3	28.8
EPV16R032...	32	4, 5	13	13.5	56	2.5	43.1	7.1	64	12.3	28.8
T/EPV16R040...	40	0.4, 0.8	16	11.5	79	4	59.1	10.4	80	13.6	36
T/EPV16R040...	40	1.2	15.5	11.5	79	4	59.1	10.4	80	13.6	36
T/EPV16R040...	40	1.6	15	11	80	3.5	59.1	9.9	80	13.2	36
T/EPV16R040...	40	2	14.5	11	80	3.5	59.1	9.9	80	13.2	36
T/EPV16R040...	40	3, 3.2	14	10	82	3	59.1	9	80	12.3	36
T/EPV16R040...	40	4, 5	13	8.5	90	2.5	59.1	7.6	80	12.3	36
TPV16R050...	50	0.4, 0.8	16	9.5	96	4	79.1	13	100	13.6	45
TPV16R050...	50	1.2	15.5	9.5	96	4	79.1	13	100	13.6	45
TPV16R050...	50	1.6	15	9	98	3.5	79.1	12.3	100	13.2	45
TPV16R050...	50	2	14.5	9	98	3.5	79.1	12.3	100	13.2	45
TPV16R050...	50	3.0, 3.2	14	8	103	3	79.1	10.9	100	12.3	45
TPV16R050...	50	4, 5	13	7	110	2.5	79.1	9.5	100	12.3	45
TPV16R063...	63	0.4, 0.8	16	7	130	4	105.1	13.6	126	13.6	56.7
TPV16R063...	63	1.2	15.5	7	130	4	105.1	13.6	126	13.6	56.7
TPV16R063...	63	1.6	15	6.5	136	3.5	105.1	12.8	126	13.2	56.7
TPV16R063...	63	2	14.5	6.5	136	3.5	105.1	12.8	126	13.2	56.7
TPV16R063...	63	3.0, 3.2	14	6	136	3	105.1	11.8	126	12.3	56.7
TPV16R063...	63	4, 5	13	5.5	140	2.5	105.1	10.8	126	12.3	56.7
TPV16R080...	80	0.4, 0.8	16	5	183	4	139.1	13.6	160	13.6	72
TPV16R080...	80	1.2	15.5	5	183	4	139.1	13.6	160	13.6	72
TPV16R080...	80	1.6	15	4.5	197	3.5	139.1	12.4	160	13.2	72
TPV16R080...	80	2	14.5	4.5	197	3.5	139.1	12.4	160	13.2	72
TPV16R080...	80	3, 3.2	14	4	207	3	139.1	11	160	12.3	72
TPV16R080...	80	4, 5	13	3.5	221	2.5	139.1	9.6	160	12.3	72
TPV16R100...	100	0.4, 0.8	16	3.5	262	4	179.1	12.9	200	13.6	90
TPV16R100...	100	1.2	15.5	3.5	262	4	179.1	12.9	200	13.6	90
TPV16R100...	100	1.6	15	3	296	3.5	179.1	11.1	200	13.2	90
TPV16R100...	100	2	14.5	3	296	3.5	179.1	11.1	200	13.2	90
TPV16R100...	100	3, 3.2	14	2.5	332	3	179.1	9.2	200	12.3	90
TPV16R100...	100	4, 5	13	2.5	309	2.5	179.1	9.2	200	11.6	90
TPV16R125...	125	0.4, 0.8	16	2.5	367	4	229.1	12.1	125	13.6	112.5
TPV16R125...	125	1.2	15.5	2.5	367	4	229.1	12.1	125	13.6	112.5
TPV16R125...	125	1.6	15	2	444	3.5	229.1	9.7	125	13.2	112.5
TPV16R125...	125	2	14.5	2	444	3.5	229.1	9.7	125	13.2	112.5
TPV16R125...	125	3, 3.2	14	1.5	554	3	229.1	7.3	125	8.7	112.5
TPV16R125...	125	4, 5	13	1.5	516	2.5	229.1	7.3	125	8.7	112.5

HYBRIDTACMILL

EPH

High precision square shoulder endmills in small diameter with XHGR type insert

A.R. = +14.7° ~ +19.5°, R.R. = -14.9° ~ -17.8°

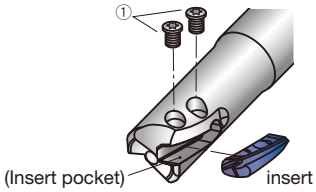


Right hand (R) shown.

Designation	Max. ap	øDc	z	øDs	L	L1	Insert
EPH11R010M10.0-2	10	10	2	10	80	21	XHGR1102...
EPH11R010M10.0-2L	10	10	2	10	100	36	XHGR1102...
EPH13R012M12.0-2	12	12	2	12	80	25	XHGR1302...
EPH13R012M12.0-2L	12	12	2	12	110	43	XHGR1302...
EPH13R013M12.0-2	12	13	2	12	110	25	XHGR1302...
EPH13R014M12.0-2	12	14	2	12	110	25	XHGR1302...
EPH18R016M16.0-2	16	16	2	16	100	33	XHGR18T2...
EPH18R016M16.0-2L	16	16	2	16	130	56	XHGR18T2...
EPH18R016M16.0-3	16	16	3	16	100	33	XHGR18T2...
EPH18R016M16.0-3L	16	16	3	16	130	56	XHGR18T2...
EPH18R017M16.0-3	16	17	3	16	130	33	XHGR18T2...
EPH18R018M16.0-3	16	18	3	16	130	33	XHGR18T2...
EPH18R020M20.0-3	16	20	3	20	110	41	XHGR18T2...
EPH18R020M20.0-3L	16	20	3	20	140	71	XHGR18T2...
EPH18R021M20.0-3	16	21	3	20	140	41	XHGR18T2...
EPH18R025M25.0-4	16	25	4	25	120	51	XHGR18T2...
EPH18R025M25.0-4L	16	25	4	25	160	88.5	XHGR18T2...
EPH18R026M25.0-4	16	26	4	25	160	51	XHGR18T2...

SPARE PARTS

Designation	①Clamping screw	Wrench	Wrench 1
EPH11R...	CSP-2L033	-	IP-6F
EPH13R...	CSPB-2.2SH	IP-7D	-
EPH18R...	CSPB-2.5SH	IP-7D	-



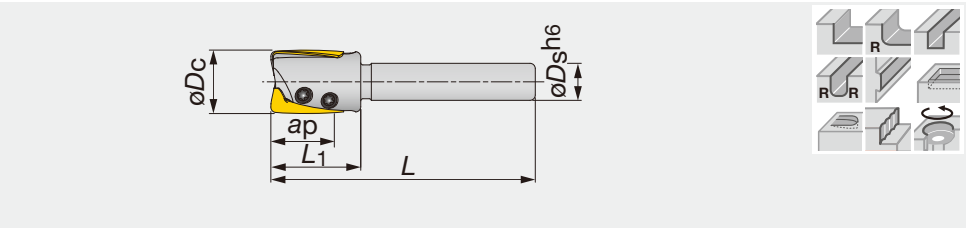
Reference pages

Inserts → **D090 - D091**, Standard cutting conditions → **D092**

EPH with slim shank

High precision square shoulder endmills with XHGR type insert, slim shank for small lathes

A.R. = +14.7° ~ +19.5°, R.R. = -14.9° ~ -17.8°



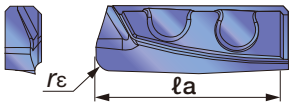
Designation	Max.ap	øDc	z	øDs	L	L1	Insert
EPH11R010M06.0-2	10	10	2	6	50	15	XHGR1102...
EPH13R012M07.0-2	12	12	2	7	50	17	XHGR1302...
EPH18R016M10.0-3	16	16	3	10	60	22	XHGR18T2...
EPH18R020M10.0-3	16	20	3	10	60	22	XHGR18T2...

SPARE PARTS

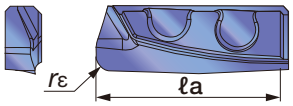
Designation	Clamping screw	Wrench	Wrench 1
EPH11R010M06.0-2	CSP-2L033	-	IP-6F
EPH13R012M07.0-2	CSPB-2.2SH	IP-7D	-
EPH18R0**M10.0-3	CSPB-2.5SH	IP-7D	-

INSERT

XHGR11/13/18-AJ



XHGR11/13/18-MJ



		Coated	
P	Steel	★	
M	Stainless	★	
K	Cast iron	★	
N	Non-ferrous		★
S	Superalloys		
H	Hard materials		

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	AH730	DS1200	ℓa
XHGR110202ER-MJ	0.2	10	●		11
XHGR110204ER-MJ	0.4	10	●		11
XHGR110205ER-MJ	0.5	10	●		11
XHGR110208ER-MJ	0.8	10	●		11
XHGR110210ER-MJ	1	10	●		11
XHGR110212ER-MJ	1.2	10	●		11
XHGR110215ER-MJ	1.5	10	●		11
XHGR110216ER-MJ	1.6	10	●		11
XHGR110220ER-MJ	2	10	●		11
XHGR130202ER-MJ	0.2	12	●		13
XHGR130204ER-MJ	0.4	12	●		13
XHGR130205ER-MJ	0.5	12	●		13
XHGR130208ER-MJ	0.8	12	●		13
XHGR130210ER-MJ	1	12	●		13
XHGR130212ER-MJ	1.2	12	●		13
XHGR130215ER-MJ	1.5	12	●		13
XHGR130216ER-MJ	1.6	12	●		13
XHGR130220ER-MJ	2	12	●		13
XHGR18T202ER-MJ	0.2	16	●		18
XHGR18T204ER-MJ	0.4	16	●		18
XHGR18T205ER-MJ	0.5	16	●		18
XHGR18T208ER-MJ	0.8	16	●		18
XHGR18T210ER-MJ	1	16	●		18
XHGR18T212ER-MJ	1.2	16	●		18
XHGR18T215ER-MJ	1.5	16	●		18

●: Line up

Reference pages

Inserts → **D090 - D091**, Standard cutting conditions → **D092**

P	Steel	★		
M	Stainless	★		
K	Cast iron	★		
N	Non-ferrous		★	
S	Superalloys			
H	Hard materials			

★ : First choice
☆ : Second choice

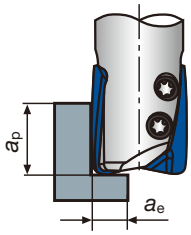
Designation	rε	Max. ap	Coated		ℓa
			AH730	DS1200	
XHGR18T216ER-MJ	1.6	16	●		18
XHGR18T220ER-MJ	2	16	●		18
XHGR110200FR-AJ	0	10		●	11
XHGR110202FR-AJ	0.2	10		●	11
XHGR110204FR-AJ	0.4	10		●	11
XHGR110205FR-AJ	0.5	10		●	11
XHGR110208FR-AJ	0.8	10		●	11
XHGR110210FR-AJ	1	10		●	11
XHGR110212FR-AJ	1.2	10		●	11
XHGR110215FR-AJ	1.5	10		●	11
XHGR110216FR-AJ	1.6	10		●	11
XHGR110220FR-AJ	2	10		●	11
XHGR130200FR-AJ	0	12		●	13
XHGR130202FR-AJ	0.2	12		●	13
XHGR130204FR-AJ	0.4	12		●	13
XHGR130205FR-AJ	0.5	12		●	13
XHGR130208FR-AJ	0.8	12		●	13
XHGR130210FR-AJ	1	12		●	13
XHGR130212FR-AJ	1.2	12		●	13
XHGR130215FR-AJ	1.5	12		●	13
XHGR130216FR-AJ	1.6	12		●	13
XHGR130220FR-AJ	2	12		●	13
XHGR18T200FR-AJ	0	16		●	18
XHGR18T202FR-AJ	0.2	16		●	18
XHGR18T204FR-AJ	0.4	16		●	18
XHGR18T205FR-AJ	0.5	16		●	18
XHGR18T208FR-AJ	0.8	16		●	18
XHGR18T210FR-AJ	1	16		●	18
XHGR18T212FR-AJ	1.2	16		●	18
XHGR18T215FR-AJ	1.5	16		●	18
XHGR18T216FR-AJ	1.6	16		●	18
XHGR18T220FR-AJ	2	16		●	18

Note: When using inserts with a corner radius in excess of 1mm,additional work to the cutter body is needed.

●: Line up

STANDARD CUTTING CONDITIONS

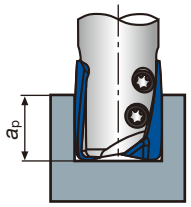
● Shoulder milling



ap: Axial depth of cut
ae: Radial depth of cut

ISO	Workpiece material	Cutting speed Vc (m/min)	Feed rate fz (mm/t)	Cutting conditions		
				ø10 ≤ øDc < ø12	ø12 ≤ øDc < ø16	ø16 ≤ øDc ≤ ø26
P	Carbon steels Alloy steels < 30HRC	60 ~ 180	0.03 ~ 0.1	Vc = 120 m/mim, fz = 0.08 mm/t		
				ap 7.5 mm	ap 9 mm	ap 12 mm
				ae 1.5 mm	ae 1.5 mm	ae 2 mm
	Alloy steels prehardened steels 30 ~ 40HRC	50 ~ 150	0.03 ~ 0.08	Vc = 100 m/min, fz = 0.05 mm/t		
				ap 5.5 mm	ap 6.5 mm	ap 9 mm
				ae 1.5 mm	ae 1.5 mm	ae 2 mm
M	Stainless steels < 250HB	50 ~ 150	0.03 ~ 0.06	Vc = 100 m/min, fz = 0.04 mm/t		
				ap 4.5 mm	ap 5.5 mm	ap 7.5 mm
				ae 1.5 mm	ae 1.5 mm	ae 2 mm
K	Cast irons	80 ~ 200	0.03 ~ 0.1	Vc = 140 m/min, fz = 0.08 mm/t		
				ap 9.5 mm	ap 11.5 mm	ap 15.5 mm
				ae 2 mm	ae 2 mm	ae 3 mm
N	Aluminium alloys Si < 12%	100 ~ 300	0.03 ~ 0.1	Vc = 200 m/min, fz = 0.07 mm/t		
				ap 9.5 mm	ap 11.5 mm	ap 15.5 mm
				ae 2 mm	ae 2 mm	ae 3 mm
	Aluminium alloys Si > 13%	80 ~ 180	0.03 ~ 0.08	Vc = 130 m/min, fz = 0.06 mm/t		
				ap 9.5 mm	ap 11.5 mm	ap 15.5 mm
				ae 2 mm	ae 2 mm	ae 3 mm

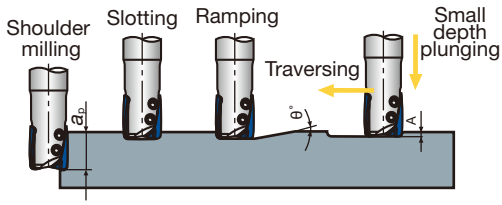
● Slotting

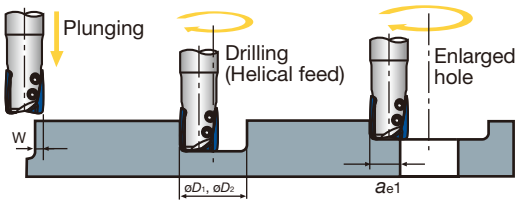


ISO	Workpiece material	Cutting speed Vc (m/min)	Feed rate fz (mm/t)	Cutting conditions				
				ø10 ≤ øDc < ø12	ø12 ≤ øDc < ø16	ø16 ≤ øDc ≤ ø18	ø18 < øDc ≤ ø21	ø21 < øDc ≤ ø26
P	Carbon steels Alloy steels < 30HRC	60 ~ 180	0.03 ~ 0.1	Vc = 100 m/mim, fz = 0.06 mm/t				
				ap 1.5 mm	ap 2 mm	ap 3 mm	ap 2.5 mm	ap 2.5 mm
	Alloy steels prehardened steels 30 ~ 40HRC	50 ~ 150	0.03 ~ 0.08	Vc = 70 m/min, fz = 0.05 mm/t				
				ap 1 mm	ap 1.5 mm	ap 2 mm	ap 1.5 mm	ap 1.5 mm
M	Stainless steels < 250HB	50 ~ 150	0.03 ~ 0.06	Vc = 70 m/min, fz = 0.04 mm/t				
				ap 1 mm	ap 1 mm	ap 1.5 mm	ap 1.5 mm	ap 1.5 mm
K	Cast irons	80 ~ 200	0.03 ~ 0.1	Vc = 120 m/min, fz = 0.07 mm/t				
				ap 3.5 mm	ap 4 mm	ap 4.5 mm	ap 3.5 mm	ap 3 mm
N	Aluminium alloys Si < 12%	100 ~ 300	0.03 ~ 0.1	Vc = 150 m/min, fz = 0.07 mm/t				
				ap 3.5 mm	ap 4 mm	ap 4.5 mm	ap 3.5 mm	ap 3 mm
	Aluminium alloys Si > 13%	80 ~ 180	0.03 ~ 0.08	Vc = 110 m/min, fz = 0.06 mm/t				
				ap 3.5 mm	ap 4 mm	ap 4.5 mm	ap 3.5 mm	ap 3 mm

Notes:
- ●When slotting, use a rigid machine.
- ●When chips stay in the cutting zone during slotting or pocketing, use air to remove chips from the work area.
- ●If chips tend to stick to the cutting edge (such as aluminium alloy machining), use a water soluble cutting fluid.
- ●If cutting a casting skin or heavily interrupted work surface, decrease the feed per tooth and maximum depth of cut to 1/2 to 2/3 times the values shown in the table.
- ●Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.
- ●Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure the machine is running normally.

APPLICATION RANGE



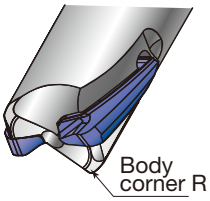


Type	Designation	Tool ø øDc	Max. depth of cut ap	Max. ramping angle θ°	Max. plunging depth A	Max. cutting width in plunging W	Min. machinable hole ø øD1	Max. machinable hole ø øD2*	Max. cutting width in enlarged hole ae1*
Straight	EPH11R010M10.0-2	10	10	3	0.3	3	13	19.5	9.7
	EPH13R012M12.0-2	12	12	3.5	0.3	3	16	23.5	11.7
	EPH18R016M16.0-2	16	16	3.5	0.3	4	22	31.5	15.7
	EPH18R016M16.0-3	16	16	3.5	0.3	4	22	31.5	15.7
	EPH18R020M20.0-3	20	16	2	0.3	4	29	39.5	19.7
	EPH18R025M25.0-4	25	16	1.5	0.3	4	39	49.5	24.7
Long	EPH11R010M10.0-2L	10	10	3	0.3	3	13	19.5	9.7
	EPH13R012M12.0-2L	12	12	3.5	0.3	3	16	23.5	11.7
	EPH18R016M16.0-2L	16	16	3.5	0.3	4	22	31.5	15.7
	EPH18R016M16.0-3L	16	16	3.5	0.3	4	22	31.5	15.7
	EPH18R020M20.0-3L	20	16	2	0.3	4	29	39.5	19.7
	EPH18R025M25.0-4L	25	16	1.5	0.3	4	39	49.5	24.7
Undercut	EPH13R013M12.0-2	13	12	2	0.3	3	17	25.5	12.7
	EPH13R014M12.0-2	14	12	1.5	0.3	3	19	27.5	13.7
	EPH18R017M16.0-3	17	16	3	0.3	4	23	33.5	16.7
	EPH18R018M16.0-3	18	16	2.5	0.3	4	25	35.5	17.7
	EPH18R021M20.0-3	21	16	2	0.3	4	31	41.5	20.7
	EPH18R026M25.0-4	26	16	1.5	0.3	4	41	51.5	25.7
For small lathes	EPH11R010M06.0-2	10	10	3	0.3	3	13	19.5	9.7
	EPH13R012M07.0-2	12	12	3.5	0.3	3	16	23.5	11.7
	EPH18R016M10.0-3	16	16	3.5	0.3	4	22	31.5	15.7
	EPH18R020M10.0-3	20	16	2	0.3	4	29	39.5	19.7

*Where the insert corner radius ≤ 0.2 mm

Notes on using large radius inserts

When using the inserts which have a large corner radius in excess of 1.0 mm, additional work is needed to the corner of the body.

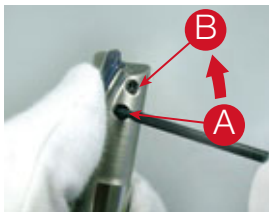


Insert corner radius r_ε (mm)	Required rework to body corner R (mm)
$0 \le r_\varepsilon \le 1.0$	No additional work
$1.0 < r_\varepsilon \le 2.0$	R2.0

Insert mounting procedure (EPH-type)

Fasten the inserts in order of Ⓐ to Ⓑ

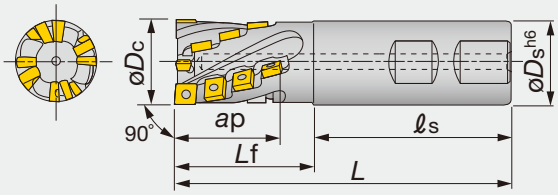
① After loosening the clamping screws, insert the insert in the insert pocket of the body while pushing it with your finger.
② Lightly fasten the clamping screws in order of A and B.
③ For all the inserts, carry out the above steps ① and ②.
④ Securely tighten the clamping screws in order of Ⓐ and Ⓑ.
(Refer to the standard tightening torque values.)
⑤ For all the inserts, carry out the above step ④.
⑥ Check the condition of insert seating, clearance between the insert and insert pocket, the tool diameter, and the peripheral edge runout.



ELP

Square shoulder endmills with long cutting edge for roughingoperation

A.R. = +11°, R.R. = -6° ~ -5°



Designation	ap	øDc	z eff	øDs	ℓs	Lf	L	Air hole	End cutting edge inserts	Both end and peripheral edge inserts
ELP07032R-A	38	32	2	32	80	60	140	with	ACMT0603... (2)	APMT0703... (14)
ELP07032R	38	32	2	32	80	60	140	without	ACMT0603... (2)	APMT0703... (14)
ELP07040R-A	44	40	2	42	80	70	150	with	ACMT0603... (2)	APMT0703... (16)
ELP07040R	44	40	2	42	80	70	150	without	ACMT0603... (2)	APMT0703... (16)
ELP09040R-A	48	40	2	42	80	70	150	with	ACMT07T3... (2)	APMT09T3... (14)
ELP09040R	48	40	2	42	80	70	150	without	ACMT07T3... (2)	APMT09T3... (14)
ELP09050R-A	56	50	2	42	80	80	160	with	ACMT07T3... (2)	APMT09T3... (16)
ELP09050R	56	50	2	42	80	80	160	without	ACMT07T3... (2)	APMT09T3... (16)
ELP12050R-A	58	50	2	42	80	80	160	with	ACMT1004... (2)	APMT1204... (12)
ELP12050R	58	50	2	42	80	80	160	without	ACMT1004... (2)	APMT1204... (12)
ELP12063R-A	68	63	2	42	80	90	170	with	ACMT1004... (2)	APMT1204... (14)
ELP12063R	68	63	2	42	80	90	170	without	ACMT1004... (2)	APMT1204... (14)

● () is the number of used insert

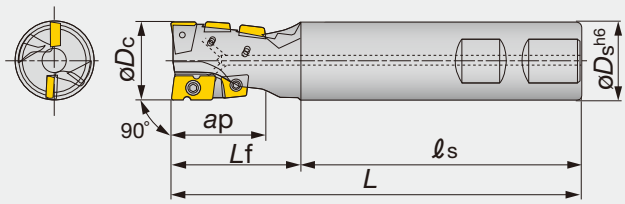
SPARE PARTS

Designation	Clamping screw	Wrench
ELP07...	CSTB-2.5	T-8D
ELP09...	CSTB-3	T-9D
ELP12...	CSTB-4M	T-15D

ELP**RA

Square shoulder endmills with long cutting edge for roughingoperation

A.R. = +15°, R.R. = -6° ~ -5°



Designation	ap	øDc	z eff	øDs	ℓs	Lf	L	Air hole	End cutting edge inserts	Both end and peripheral edge inserts
ELP13025RA-A	28	25	2	25	90	40	130	with	ADMT1303... (1)	APMT0703... (4)
ELP13025RA	28	25	2	25	90	40	130	without	ADMT1303... (1)	APMT0703... (4)
ELP17032RA-A	35	32	2	32	90	50	140	with	ADMT17T3... (1)	APMT09T3... (4)
ELP17032RA	35	32	2	32	90	50	140	without	ADMT17T3... (1)	APMT09T3... (4)
ELP21040RA-A	44	40	2	42	90	60	150	with	ADMT2104... (1)	APMT1204... (4)
ELP21040RA	44	42	2	40	90	60	150	without	ADMT2104... (1)	APMT1204... (4)

● () is the number of used insert

SPARE PARTS

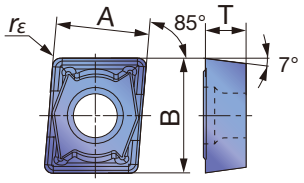
Designation	Clamping screw	Clamping screw 1	Lubricant	Wrench	Wrench 1
ELP13...	CSPD-3	CSPB-2.5	M-1000	IP-10D	IP-8D
ELP17...	CSPD-3	CSPB-4S	M-1000	IP-10D	IP-15D
ELP21...	CSTB-5	CSPB-4	M-1000	IP-15D	T-20D

Reference pages

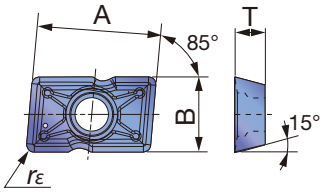
Inserts → **D095**, Standard cutting conditions → **D096**

INSERT

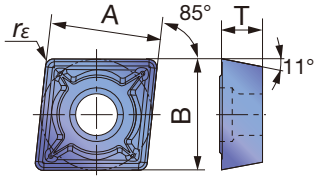
ACMT06/07/10-MJ



ADMT13/17/21-MJ



APMT07/09/12-MJ



P	Steel	☆		☆	★	
M	Stainless		★			
K	Cast iron	★				
N	Non-ferrous					
S	Superalloys	☆				
H	Hard materials					

★ : First choice
☆ : Second choice

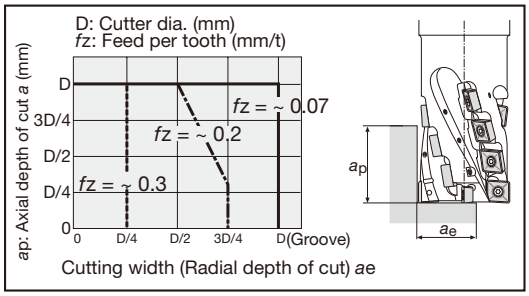
Designation	rε	Coated				A	B	T
		AH120	AH140	GH330	T3130			
ACMT060308PR-MJ	0.8	●	●	●	●	6	7.8	3.18
ACMT07T308PR-MJ	0.8	●	●	●	●	7.5	9.5	3.97
ACMT100408PR-MJ	0.8	●	●	●	●	10	12.7	4.76
ADMT130308PR-MJ	0.8	●	●		●	13.1	8	3.18
ADMT17T308PR-MJ	0.8	●	●		●	16.6	9.5	3.97
ADMT210408PR-MJ	0.8	●	●		●	20.6	12.7	4.76
APMT070308PN-MJ	0.8	●	●	●	●	7.9	7.9	3.18
APMT09T308PN-MJ	0.8	●	●	●	●	9.5	9.5	3.97
APMT120408PN-MJ	0.8	●	●	●	●	12.7	12.7	4.76

●: Line up

STANDARD CUTTING CONDITIONS

ELP type

ISO	Workpiece material	Grade	Cutter diameter (mm) ø32 Vc (m/min)	ø32 fz (mm/t)	ø40 Vc (m/min)	ø40 fz (mm/t)	ø50 Vc (m/min)	ø50 fz (mm/t)	ø63 Vc (m/min)	ø63 fz (mm/t)
P	Mild steels, Low carbon steels E275A, C15E4, etc.	T3130 (AH120)	60 ~ 150	0.1 ~ 0.3	70 ~ 150	0.1 ~ 0.3	70 ~ 150	0.1 ~ 0.3	70 ~ 150	0.1 ~ 0.3
P	High carbon steels, Alloy steels C55, 42CrMo4, etc.	T3130 (AH120)	60 ~ 120	0.1 ~ 0.3	60 ~ 120	0.1 ~ 0.3	60 ~ 150	0.1 ~ 0.3	60 ~ 150	0.1 ~ 0.3
P	Die steels X153CrMoV12, etc.	T3130 (AH120)	60 ~ 100	0.1 ~ 0.3	60 ~ 100	0.1 ~ 0.3	60 ~ 120	0.1 ~ 0.3	60 ~ 120	0.1 ~ 0.3
M	Stainless steels X5CrNi18-9, etc.	AH140	70 ~ 120	0.1 ~ 0.3	60 ~ 120	0.1 ~ 0.3	60 ~ 120	0.1 ~ 0.3	60 ~ 120	0.1 ~ 0.3
K	Cast irons 250, 450-10S, etc.	AH120	60 ~ 150	0.1 ~ 0.3	60 ~ 150	0.1 ~ 0.3	60 ~ 150	0.1 ~ 0.3	60 ~ 150	0.1 ~ 0.3
S	Heat-resisting alloy Inconel 718 / Ti-6Al-4V etc.	AH120	20 ~ 50	0.08 ~ 0.15	20 ~ 50	0.08 ~ 0.15	20 ~ 50	0.08 ~ 0.15	20 ~ 50	0.08 ~ 0.15



- *Vc*: Cutting speed
- *fz*: Feed per tooth (Feed per revolution is ***fz*** × 2 as effective number of teeth is equal to two)

Notes :
- Dry cutting (or air-blowing) is generally recommended. When chips tend to adhere to the cutting edges such as in milling stainless steel, use a water-soluble cutting fluid.
- When the cutting width is larger than a half of the cutter diameter or chips tend to stay in the cutting area, use an air blast to remove chips.
- To get the best of the tool performance, use of a high-accuracy, side-lock type toolholder or milling chuck which has a high gripping force is recommended. Excessive tool overhang from the toolholder should be avoided to prevent chatter.

- No. of revolutions (min^{-1}) = Cutting speed × 1000 ÷ 3.14 ÷ Cutter diameter
- Table feed (mm/min) = No. of revolutions × Feed per tooth × No. of inserts

ELP**RA type

ISO	Workpiece material	Grade	Cutter diameter (mm) ø25 Vc (m/min)	ø25 fz (mm/t)	ø32 Vc (m/min)	ø32 fz (mm/t)	ø40 Vc (m/min)	ø40 fz (mm/t)
P	Mild steels, Low carbon steels E275A, C15E4, etc.	T3130 (AH120)	60 ~ 150	0.08 ~ 0.2	60 ~ 150	0.1 ~ 0.3	60 ~ 150	0.1 ~ 0.3
P	High carbon steels, Alloy steels C55, 42CrMo4, etc.	T3130 (AH120)	60 ~ 120	0.08 ~ 0.2	60 ~ 120	0.1 ~ 0.3	60 ~ 120	0.1 ~ 0.3
P	Die steels X153CrMoV12, etc.	T3130 (AH120)	60 ~ 100	0.08 ~ 0.2	60 ~ 100	0.1 ~ 0.3	60 ~ 100	0.1 ~ 0.3
M	Stainless steels X5CrNi18-9, etc.	AH140	70 ~ 120	0.08 ~ 0.2	70 ~ 120	0.1 ~ 0.3	70 ~ 120	0.1 ~ 0.3
K	Cast irons 250, 450-10S, etc.	AH120	60 ~ 150	0.08 ~ 0.2	60 ~ 150	0.1 ~ 0.3	60 ~ 150	0.1 ~ 0.3
S	Heat-resisting alloy Inconel 718 / Ti-6Al-4V etc.	AH120	20 ~ 50	0.08 ~ 0.15	20 ~ 50	0.08 ~ 0.15	20 ~ 50	0.08 ~ 0.15

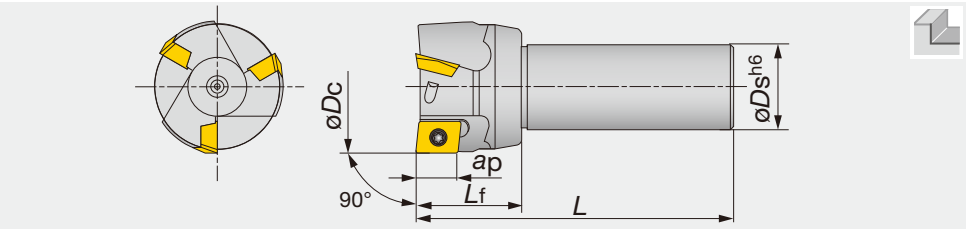
- *Vc*: Cutting speed
- *fz*: Feed per tooth (Feed per revolution is *fz* × 2 as effective number of teeth is equal to two)

Notes :
- To get the best of the tool's performance, use of a high-accuracy, side-lock type toolholder or milling chuck which has a high gripping force is recommended.
- Excessive tool overhang from the toolholder should be avoided to prevent chatter.

EPE4000,5000,6000

High precision shoulder square endmills with AECW inserts

A.R. = +12° ~ +17°, R.R. = -10° ~ 0°



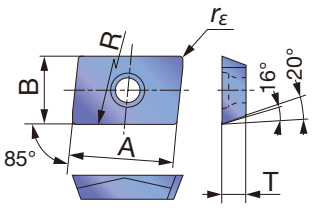
Designation	Max. ap	øDc	z	øDs	Lf	L	Insert
EPE4020R	12	20	1	20	30	100	AE*W14...
EPE4025R	12	25	2	25	35	115	AE*W14...
EPE5030R	14	30	2	32	40	120	AE*W16...
EPE5035R	14	35	2	32	40	120	AE*W16...
EPE5040R	14	40	2	32	40	120	AE*W16...
EPE6050R	16	50	3	32	40	120	AE*W18...
EPE6063R	16	63	4	32	45	125	AE*W18...

SPARE PARTS

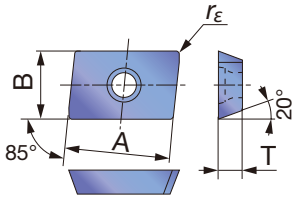
Designation	Clamping screw	Wrench
EPE402*R	CSTB-3S	T-9D
EPE50**R	CSTB-4S	T-15D
EPE60**R	CSTB-4M	T-15D

INSERT

AECW14/16/18



AEMW14/16/18



		Coated			Cermet		Uncoated		
P	Steel	★	★		★		☆		
M	Stainless	★	★						
K	Cast iron	★	★						
N	Non-ferrous							★	
S	Superalloys	★							
H	Hard materials								

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	AH120	GH330	NS740	UX30	TH10	A	B	T
AECW1403PEFR	0.4	12					●	14	9	3.18
AECW1403PESR	0.4	12	●	●	●	●		14	9	3.18
AECW16T3PEFR	0.4	14					●	16	12	3.97
AECW16T3PESR	0.4	14	●	●	●	●		16	12	3.97
AECW1804PEFR	0.4	16					●	18	12	4.76
AECW1804PESR	0.4	16	●	●	●	●		18	12	4.76
AEMW1403PEFR	0.4	12					●	14	8.9	3.18
AEMW1403PETR	0.4	12		●	●	●		14	8.9	3.18
AEMW16T3PEFR	0.4	14					●	16	11.9	3.97
AEMW16T3PETR	0.4	14		●	●	●		16	11.9	3.97
AEMW1804PEFR	0.4	16					●	18	11.9	4.76
AEMW1804PETR	0.4	16		●	●	●		18	11.9	4.76

●: Line up

Reference pages

Standard cutting conditions → **D098**

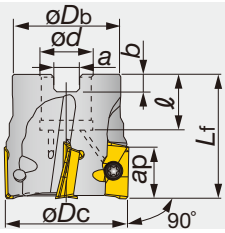
STANDARD CUTTING CONDITIONS

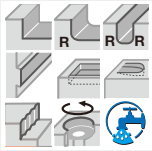
ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min) ø20 ~ 35 mm	Cutting speed *Vc* (m/min) ø40 ~ 63 mm	Feed per tooth *fz* (mm/t)
P	Mild steels·Unhardened steels < 180 HB C15E4, E275A, etc.	AH120 · GH330	80 ~ 150	130 ~ 230	0.1 ~ 0.2
		NS740	100 ~ 150	130 ~ 180	0.1 ~ 0.15
		UX30	80 ~ 150	100 ~ 150	0.1 ~ 0.2
	Carbon steels, Alloy steels < 300HB C55, 42CrMo4, etc.	AH120 · GH330	80 ~ 100	100 ~ 200	0.1 ~ 0.2
		NS740	80 ~ 100	100 ~ 150	0.1 ~ 0.15
		UX30	80 ~ 100	80 ~ 120	0.1 ~ 0.2
	Die steels < 300HB	AH120 · GH330 NS740	80 ~ 100	100 ~ 120	0.1 ~ 0.15
M	Stainless steels X5CrNi18-9, etc.	AH120 · GH330	100 ~ 200	120 ~ 200	0.1 ~ 0.2
K	Cast irons Ductile cast irons	TH10	80 ~ 100	80 ~ 100	0.1 ~ 0.15
		AH120	80 ~ 150	80 ~ 150	0.1 ~ 0.2
N	Aluminium alloys Si < 13%	TH10	200 ~ 300	300 ~ 500	0.1 ~ 0.25

TPS17

Square shoulder mills with ASMT/ASGT17 inserts, suitable for multi purpose machining

A.R. = +9°, R.R. = -20°~ -7°





Right hand (R) shown.

Designation	Max. ap	øDc	z	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TPS17040RB-E	16.2	40	4	40	16	19	8.4	5.6	0.2	without	AS*T1705...
TPS17050RB-E	16.1	50	5	40	22	20	10.4	6.3	0.3	without	AS*T1705...
TPS17063RB-E	16	63	6	45	22	20	10.4	6.3	0.6	without	AS*T1705...

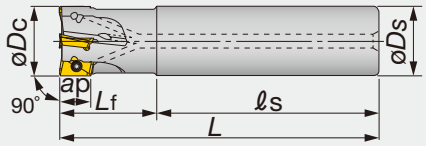
SPARE PARTS

Designation	Clamping screw	Lubricant	Center bolt	Wrench
TPS17040RB-E	CSPB-4S	M-1000	FSHM8-30	IP-15D
TPS17050RB-E	CSPB-4S	M-1000	CAP-CM10X1.5X30	IP-15D
TPS17063RB-E	CSPB-4S	M-1000	CAP-CM10X1.5X30	IP-15D

EPS17

Square shoulder endmills with ASMT/ASGT17 inserts

A.R. = +9°~ +17° ,R.R. = -20°~ -7°



Right hand (R) shown.

Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Air hole	Insert
EPS17025RS	16.3	25	2	25	80	35	115	with	AS*T1705...
EPS17025RL	16.3	25	2	25	150	70	220	with	AS*T1705...
EPS17026RS	16.3	26	2	25	80	35	115	with	AS*T1705...
EPS17026RL	16.3	26	2	25	150	70	220	with	AS*T1705...
EPS17030RS	16.2	30	2	25	80	35	115	with	AS*T1705...
EPS17030RSB	16.2	30	3	25	80	35	115	with	AS*T1705...
EPS17030RL	16.2	30	2	25	150	70	220	with	AS*T1705...
EPS17032RSB-E	16.2	32	3	32	70	40	110	with	AS*T1705...
EPS17032RS	16.2	32	2	32	80	40	120	with	AS*T1705...
EPS17032RSB	16.2	32	3	32	80	40	120	with	AS*T1705...
EPS17032RL	16.2	32	2	32	175	80	255	with	AS*T1705...
EPS17033RS	16.2	33	2	32	80	40	120	with	AS*T1705...
EPS17033RSB	16.2	33	3	32	80	40	120	with	AS*T1705...
EPS17033RL	16.2	33	2	32	175	80	255	with	AS*T1705...
EPS17040RS	16.2	40	3	32	80	40	120	with	AS*T1705...
EPS17040RSB	16.2	40	4	32	80	40	120	with	AS*T1705...
EPS17040RL	16.2	40	2	32	205	50	255	with	AS*T1705...
EPS17040RLS42	16.2	40	2	42	210	100	310	with	AS*T1705...
EPS17050RSB	16.1	50	5	32	80	40	120	with	AS*T1705...
EPS17050RL	16.1	50	3	42	310	50	360	with	AS*T1705...
EPS17063RSB	16	63	6	32	80	45	125	with	AS*T1705...
EPS17063RL	16	63	3	42	310	50	360	with	AS*T1705...

SPARE PARTS

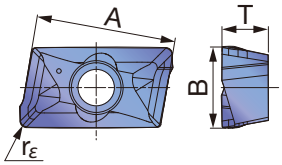
Designation	Clamping screw	Lubricant	Wrench
EPS17	CSPB-4S	M-1000	IP-15D

Reference pages

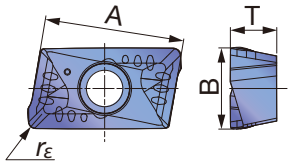
Inserts → **D100**, Standard cutting conditions → **D101**

INSERT

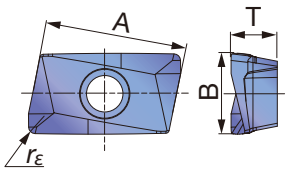
ASMT17-MJ



ASMT17-MS



ASGT17-AJ



		AH120	AH130	AH140	T1115	T3130	DS1100	NS740	KS05F
P	Steel	★				★		★	
M	Stainless		★	★					
K	Cast iron	★			★				
N	Non-ferrous						★		★
S	Superalloys	★	★						
H	Hard materials								

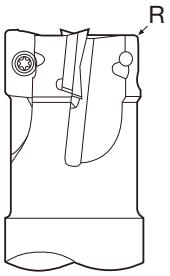
★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated						Cermet	Un-coated	A	B	T
			AH120	AH130	AH140	T1115	T3130	DS1100	NS740	KS05F			
ASMT170504PDPR-MJ	0.4	16	●			●	●		●		16.9	9.8	5.6
ASMT170508PDPR-MJ	0.8	16	●			●	●		●		16.9	9.8	5.6
ASMT170512PDPR-MJ	1.2	16	●				●				16.9	9.8	5.6
ASMT170516PDPR-MJ	1.6	16	●				●		●		16.9	9.8	5.6
ASMT170520PDPR-MJ	2	16	●								16.9	9.8	5.6
ASMT170530PDPR-MJ	3	16	●								16.9	9.8	5.6
ASMT170532PDPR-MJ	3.2	16	●				●		●		16.9	9.8	5.6
ASMT170508PDPR-MS	0.8	16		●	●						16.9	9.8	5.6
ASGT170504PDFR-AJ	0.4	16						●		●	16.9	9.8	5.6
ASGT170508PDFR-AJ	0.8	16						●		●	16.9	9.8	5.6

●: Line up

CAUTIONARY POINT IN MODIFYING CUTTER BODIES

When using inserts with corner radius $r_\varepsilon \geq 2.0$ mm, standard cutter bodies have to be modified "R".



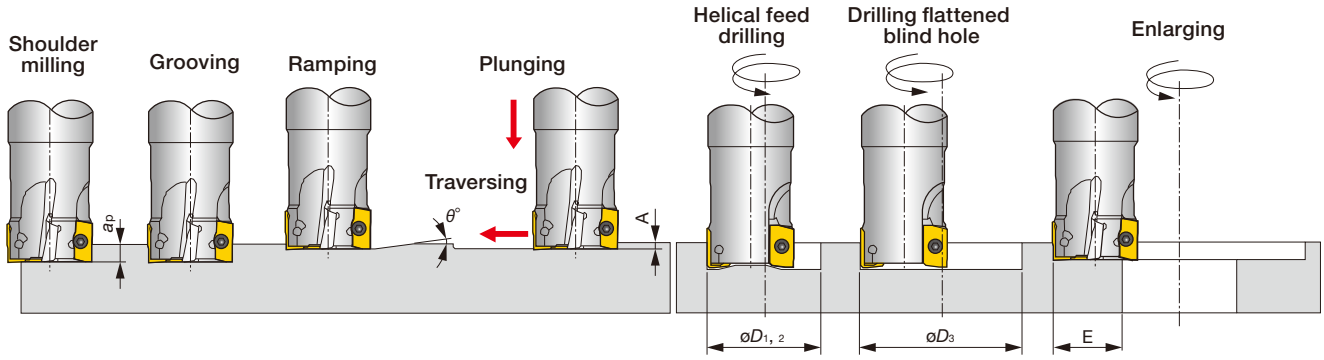
Corner radius r_ε (mm)	The dimension of modifying (mm)
0.4 ~ 1.6	Unnecessary
2.0 ~ 3.2	2

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Chip-breaker	Cutting speed *Vc* (m/min)			Feed per tooth *fz* (mm/t)		
				Cutter dia. ø12	Cutter dia. ø16, ø20	Cutter dia. > ø25	Cutter dia. ø12	Cutter dia. ø16, ø20	Cutter dia. > ø25
P	Mild steel, Low Carbon steels C10, E275A, etc. < 180HB	NS740	MJ	80 ~ 100	100 ~ 120	100 ~ 150	0.05 ~ 0.08	0.05 ~ 0.12	0.05 ~ 0.15
		AH120	MJ	80 ~ 100	100 ~ 150	100 ~ 150	0.05 ~ 0.1	0.12 ~ 0.2	0.12 ~ 0.2
	Carbon steels, Alloy steels C55, 42CrMo4, etc. < 300HB	NS740	MJ	80 ~ 100	80 ~ 100	80 ~ 120	0.05 ~ 0.08	0.05 ~ 0.08	0.05 ~ 0.1
		T3130	MJ	80 ~ 100	80 ~ 120	100 ~ 200	0.05 ~ 0.1	0.10 ~ 0.15	0.1 ~ 0.2
	Die steels X96CrMoV12, etc. < 300HB	T3130	MJ	80 ~ 100	80 ~ 120	100 ~ 150	0.05 ~ 0.1	0.1 ~ 0.15	0.12 ~ 0.2
M	Stainless steels X5CrNi18-9, etc. < 250HB	AH130	MS	80 ~ 100	100 ~ 150	100 ~ 200	0.05 ~ 0.1	0.12 ~ 0.15	0.12 ~ 0.2
K	Grey Cast irons, DuctileCast irons etc. 250, 400-15S, etc.	T1115	MJ	80 ~ 100	100 ~ 150	100 ~ 200	0.08 ~ 0.12	0.12 ~ 0.2	0.15 ~ 0.25
N	Aluminium alloys Si < 13%	DS1100	AJ	300 ~ 1000	300 ~ 1000	300 ~ 1000	0.05 ~ 0.2	0.05 ~ 0.2	0.05 ~ 0.2
	Aluminium alloys Si ≥ 13%	DS1100	AJ	100 ~ 200	100 ~ 200	100 ~ 200	0.05 ~ 0.2	0.05 ~ 0.2	0.05 ~ 0.2
	Copper alloys	KS05F	AJ	200 ~ 500	200 ~ 500	200 ~ 500	0.05 ~ 0.2	0.05 ~ 0.2	0.05 ~ 0.2
S	Titanium alloys Ti-6Al-4V, etc.	AH130	MS	20 ~ 60	20 ~ 60	20 ~ 60	0.05 ~ 0.1	0.05 ~ 0.1	0.05 ~ 0.1
	Heat-resistant alloys Inconel 718, etc.	AH120	MJ	20 ~ 40	20 ~ 40	20 ~ 40	0.05 ~ 0.08	0.05 ~ 0.08	0.05 ~ 0.08

Notes:
- When using at L/D ≥ 4, machining at the lower feed rate.
- This TAC mill is not designed to cope with the centrifugal force and dynamic balance at high speeds over 1000 m/min. Therefore, the cutting speed in the outer diameter of the mill should not exceed 1000 m/min.

APPLICATION RANGE



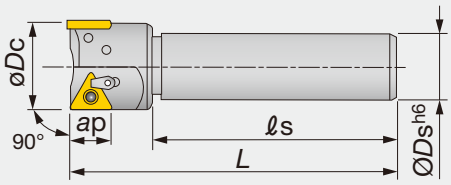
Designation	Tool ø	Max. depth of cut *ap* (mm)	Max. ramping angle *θ°*	Max. plunging depth A (mm)	Min. machining hole dia. *øD*1 (mm)*	Max. machining hole dia. *øD*2 (mm)*	Hole dia. in drilling (Blind hole) *øD*3 (mm)*	Max. cutting width in enlarging hole E (mm)
EPS17025RS/L	25	16.3	5	1	32	48	46 ~ 48	24
EPS17026RS/L	26	16.3	5	1	34	51	49 ~ 51	25.5
EPS17030RS/B/L	30	16.2	4	1	42	59	57 ~ 59	29.5
EPS17032RS/B/L	32	16.2	3.5	1	46	62	60 ~ 62	31
EPS17033RS/B/L	33	16.2	3.5	1	48	65	63 ~ 65	32.5
E/TPS17040RS/B/L	40	16.2	2.5	1	62	78	76 ~ 78	39
EPS17040RLS42	40	16.2	2.5	1	62	78	76 ~ 78	39
E/TPS17050RS/B/L	50	16.1	1.5	1	82	98	96 ~ 98	49
E/TPS17063RS/B/L	63	16	1	1	108	124	122 ~ 124	62

Notes : Corner t_ε for dimensions of ø*D*1, ø*D*2, and ø*D*3: $r_\varepsilon = 0.8$

PES1500

Square shoulder endmills with triangle inserts

A.R. = +3°~ +5°, R.R. = -8°~ 0°



Designation	Max. *ap*	*øDc*	z	*øDs*	*ℓs*	*L*	Insert
PES1535R	19	35	2	32	120	160	TP*A43...
PES1540R	19	40	2	32	120	160	TP*A43...
PES1550R	19	50	3	32	120	160	TP*A43...

SPARE PARTS

Designation	Clamp set	Clamping screw	Wrench
PES15...	CSG-5T	CSTA-4	T-15D

INSERT

TPCA/TPMA

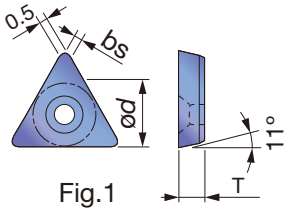


Fig.1

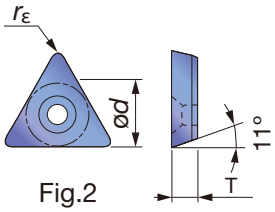


Fig.2

		Cermet		Uncoated		
P	Steel	★		★		
M	Stainless					
K	Cast iron				★	
N	Non-ferrous				★	
S	Superalloys					
H	Hard materials					

★ : First choice
☆ : Second choice

Designation	*rε*	Max. *ap*	NS740		UX30	TH10		*ød*	T	bs	Fig.
TPCA43ZTRW1	-	19				●		12.7	4.76	1	1
TPMA432TNW1	0.8	19	●		●	●		12.7	4.76	-	2

●: Line up

STANDARD CUTTING CONDITIONS

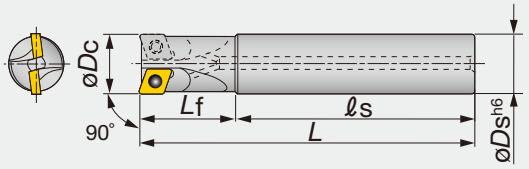
ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (m/min)
P	Mild steels	UX30	100 ~ 150	0.1 ~ 0.3
	Carbon steels	UX30	100 ~ 120	0.1 ~ 0.25
	Alloy steels	UX30	80 ~ 100	0.1 ~ 0.2
	Die steels 20 ~ 30HRC	UX30	50 ~ 70	0.1 ~ 0.2
K	Cast irons	TH10	70 ~ 90	0.1 ~ 0.3
N	Non-ferrous metals	TH10	200 ~ 500	0.05 ~ 0.2

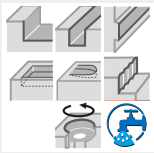
- No. of revolutions (min^{-1}) = Cutting speed × 1000 ÷ 3.14 ÷ Cutter diameter
- Table feed (mm/min) = No. of revolutions × Feed per tooth × No. of inserts

ESD10,17

Multi purpose square endmills

ESD10 A.R.=+8.5°~+10°,R.R.=-10°~-5°
ESD17 A.R.=+10°,R.R.=-5°~-3°





Designation	Max. *ap*	*øDc*	z	*øDs*	*ℓs*	*Lf*	*L*	Air hole	Insert
ESD10020RSA	9	20	1	20	90	30	120	with	GD*T10...
ESD10020RS	9	20	1	20	90	30	120	without	GD*T10...
ESD10020RLA	9	20	1	20	135	50	185	with	GD*T10...
ESD10020RL	9	20	1	20	135	50	185	without	GD*T10...
ESD10025RSA	9	25	2	25	100	40	140	with	GD*T10...
ESD10025RS	9	25	2	25	100	40	140	without	GD*T10...
ESD10025RLA	9	25	2	25	150	70	220	with	GD*T10...
ESD10025RL	9	25	2	25	150	70	220	without	GD*T10...
ESD10032RSA	9	32	2	32	110	50	160	with	GD*T10...
ESD10032RS	9	32	2	32	110	50	160	without	GD*T10...
ESD10032RLA	9	32	2	32	175	80	255	with	GD*T10...
ESD10032RL	9	32	2	32	175	80	255	without	GD*T10...
ESD17040RSA	15	40	2	42	120	60	180	with	GD*T17...
ESD17040RS	15	40	2	42	120	60	180	without	GD*T17...
ESD17040RLA	15	40	2	42	210	100	310	with	GD*T17...
ESD17040RL	15	40	2	42	210	100	310	without	GD*T17...
ESD17050RSA	15	50	2	42	160	50	210	with	GD*T17...
ESD17050RS	15	50	2	42	160	50	210	without	GD*T17...
ESD17050RLA	15	50	2	42	310	50	360	with	GD*T17...
ESD17050RL	15	50	2	42	310	50	360	without	GD*T17...
ESD17063RSA	15	63	3	42	190	50	240	with	GD*T17...
ESD17063RS	15	63	3	42	190	50	240	without	GD*T17...
ESD17063RLA	15	63	3	42	310	50	360	with	GD*T17...
ESD17063RL	15	63	3	42	310	50	360	without	GD*T17...

SPARE PARTS

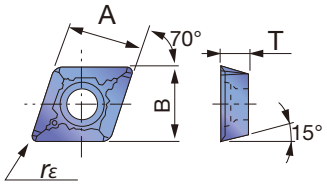
Designation	Clamping screw	Lubricant	Wrench
ESD100**R**	CSTB-3.5H	M-1000	T-15D
ESD170**R**	CSTB-5	M-1000	T-20D

Reference pages

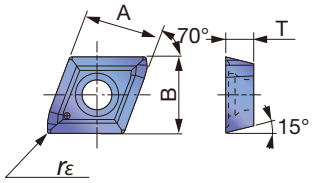
Inserts, Standard cutting conditions → **D105**

INSERT

GDMT10/17-MJ



GDGT10/17-AJ



P	Steel	☆		★	★			☆		
M	Stainless		★							
K	Cast iron	★								
N	Non-ferrous					★			★	
S	Superalloys	☆								
H	Hard materials									

★ : First choice
☆ : Second choice

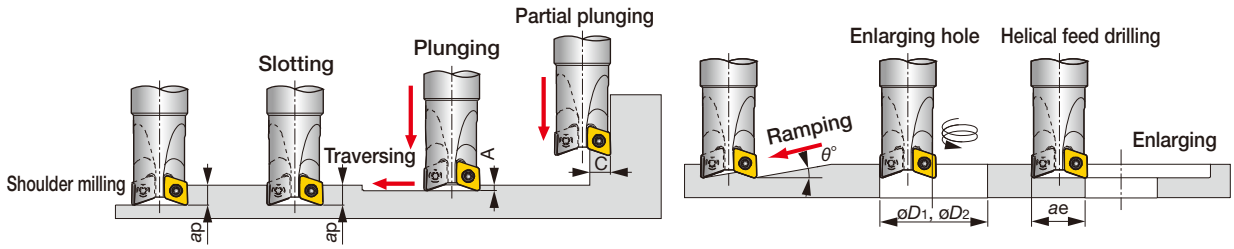
Designation	rε	Max. ap	Coated					Uncoated			A	B	T
			AH120	AH140	AH330	T3130	DS1100	UX30	TH10				
GDMT10H3PDPR-MJ	0.8	9	●	●	●	●		●			10	10	3.5
GDMT17X6PDPR-MJ	1.2	15	●	●	●	●		●			16	16	6
GDGT10H3PDFR-AJ	0.4	9					●		●		10	10	3.5
GDGT17X6PDFR-AJ	0.8	15					●		●		16	16	6

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	ESD (ø20 ~ 32 mm) Cutting speed Vc (m/min)	ESD Feed per tooth fz (mm/t) Shouldering, grooving, Z-feed milling	ESD Feed per tooth fz (mm/t) Partial plunging	T/ESD (ø40 ~ 80 mm) Cutting speed Vc (m/min)	T/ESD Feed per tooth fz (mm/t) Shouldering, grooving, Z-feed milling	T/ESD Feed per tooth fz (mm/t) Partial plunging
P	Carbon steels C50, etc. < 300 HB	AH120	100 ~ 180	0.05 ~ 0.2	0.03 ~ 0.1	120 ~ 200	0.08 ~ 0.25	0.03 ~ 0.1
		AH330	120 ~ 230	0.05 ~ 0.15	0.03 ~ 0.08	150 ~ 250	0.05 ~ 0.2	0.03 ~ 0.08
		T3130	100 ~ 180	0.05 ~ 0.2	0.03 ~ 0.1	120 ~ 200	0.08 ~ 0.25	0.03 ~ 0.1
	Alloy steels 42CrMo4, etc. < 300 HB	AH120	80 ~ 160	0.05 ~ 0.15	0.03 ~ 0.08	100 ~ 180	0.08 ~ 0.2	0.03 ~ 0.08
		AH330	100 ~ 200	0.05 ~ 0.13	0.03 ~ 0.06	120 ~ 230	0.05 ~ 0.15	0.03 ~ 0.06
		T3130	80 ~ 160	0.05 ~ 0.15	0.03 ~ 0.08	100 ~ 180	0.08 ~ 0.2	0.03 ~ 0.08
	Die steels X96CrMoV12, etc. < 300 HB	AH120	60 ~ 120	0.05 ~ 0.13	0.03 ~ 0.06	80 ~ 150	0.08 ~ 0.15	0.03 ~ 0.06
		AH330	80 ~ 160	0.05 ~ 0.1	0.03 ~ 0.05	100 ~ 200	0.05 ~ 0.13	0.03 ~ 0.05
		T3130	60 ~ 120	0.05 ~ 0.13	0.03 ~ 0.06	80 ~ 150	0.08 ~ 0.15	0.03 ~ 0.06
M	Stainless steels X5CrNi18-9, etc.	AH140	80 ~ 160	0.05 ~ 0.15	0.03 ~ 0.08	100 ~ 180	0.08 ~ 0.2	0.03 ~ 0.08
K	Cast irons 250, etc.	AH120	100 ~ 180	0.05 ~ 0.25	0.03 ~ 0.1	120 ~ 200	0.08 ~ 0.25	0.03 ~ 0.1
N	Aluminium alloys	DS1100	200 ~ 1000	0.05 ~ 0.25	0.05 ~ 0.15	200 ~ 1000	0.05 ~ 0.25	0.05 ~ 0.15
	Copper alloys	TH10	200 ~ 400	0.05 ~ 0.25	0.05 ~ 0.15	200 ~ 400	0.05 ~ 0.25	0.05 ~ 0.15
S	Titanium alloys Ti-6Al-4V, etc.	AH140	20 ~ 60	0.05 ~ 0.1	0.03 ~ 0.08	20 ~ 60	0.05 ~ 0.1	0.03 ~ 0.08
	Heat-resistant alloys Inconel 718, etc.	AH120	20 ~ 40	0.05 ~ 0.08	0.03 ~ 0.05	20 ~ 40	0.05 ~ 0.08	0.03 ~ 0.05

APPLICATION RANGE

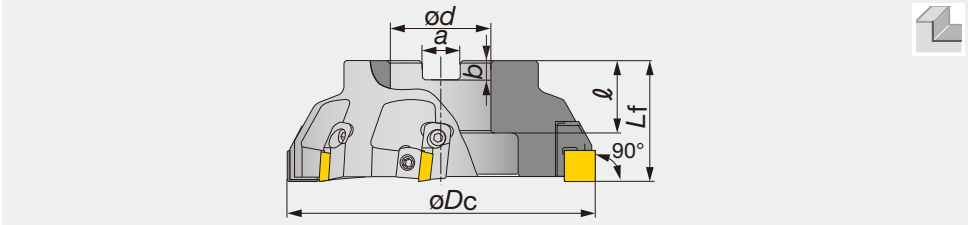


Designation	Tool øDc (mm)	Max. depth of cut ap (mm)	Max. plunging depth A (mm)	Max. plunging width C (mm)	Max. ramping angle θ°	Min. machinable hole dia. øD1 (mm)	Max. machinable hole dia. øD2 (mm)	Max. cutting width in enlarging hole ae (mm)
ESD10020R...	20	9	2.5	8	10	24	38	18
ESD10025R...	25	9	2.5	9	10	32	48	23
ESD10032R...	32	9	2.5	9	6.5	46	62	30
ESD17040RS/L (A)	40	15	4.5	15	10	50	77	38
ESD17050RS/L (A)	50	15	4.5	15	8	70	97	48
ESD17063RS/L (A)	63	15	4.5	15	5.5	96	123	61

TPP16

Square shoulder mills with wedge clamped SPMR16 inserts in large depth of cut.

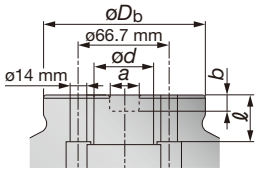
A.R.=+6°,R.R.=-8°



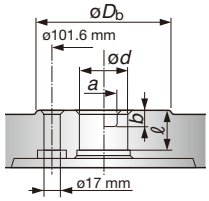
Designation	Max. ap	øDc	z	Lf	ød	ℓ	a	b	Kg	Insert
TPP16080RI-E	12	80	4	50	27	26	12.4	7	1	SPMR1605...
TPP16100RI-E	12	100	5	63	32	32	14.4	8	1.8	SPMR1605...
TPP16125RI-E	12	125	6	63	40	32	16.4	9	2.8	SPMR1605...
TPP16160RI-E	12	160	8	63	40	29	16.4	9	4.6	SPMR1605...
TPP16200RI-E	12	200	10	63	60	38	25.7	14	6.9	SPMR1605...
TPP16250RI-E	12	250	12	63	60	38	25.7	14	13	SPMR1605...
TPP16315RI-E	12	315	14	63	60	38	25.7	14	22.2	SPMR1605...

Arbor type

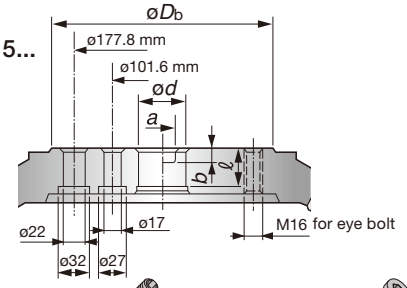
TPP16160...



TPP16200/250...

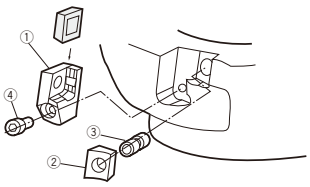


TPP16315...



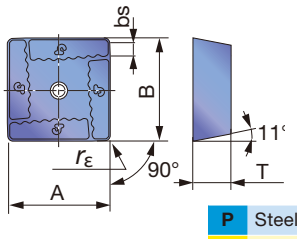
SPARE PARTS

Designation	①Locator	②Wedge	③Right-left screw	④Locator fixing screw	Wrench
TPP16080, 100RI-E	LPP16R	WPP16R	FDS-8SS	CM5X0.8X12	TP-4
TPP16125 - 315RI-E	LPP16R	WPP16R	FDS-8S	CM5X0.8X12	TP-4

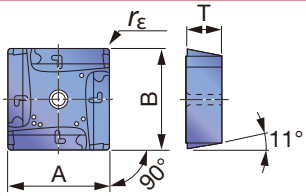


INSERT

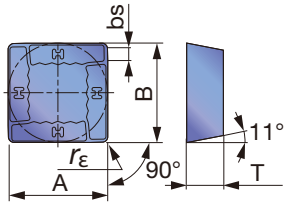
SPMR16-MJ



SPMR16-ML



SPMR16-MH



		Coated				Un-coated	
P	Steel	★		★		☆	
M	Stainless	☆					
K	Cast iron		★			☆	
N	Non-ferrous						
S	Superalloys						
H	Hard materials						

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	GH330	T1115	T3130	UX30	A	B	T	bs
SPMR1605PPTR-MJ	0.8	12	●	●	●	●	16	16	5.56	2
SPMR1605PPPR-ML	0.8	12	●				16	16	5.56	-
SPMR1605PPTR-MH	0.8	12	●		●	●	16	16	5.56	2

●: Line up

Reference pages

Standard cutting conditions → **D108**

STANDARD CUTTING CONDITIONS

For MJ-chipbreaker inserts (General purpose)

ISO	Workpiece material	Grade	Roughing (Depth of cut: *ap* > 1.5 mm)		Finishing (Depth of cut: *ap* = 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	GH330	100 ~ 230	0.1 ~ 0.25	130 ~ 250	0.1 ~ 0.3
		T3130	130 ~ 300	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
		UX30	100 ~ 180	0.1 ~ 0.25	130 ~ 200	0.1 ~ 0.3
	Carbon steels Alloy steels < 300 HB	GH330	100 ~ 180	0.1 ~ 0.2	130 ~ 200	0.1 ~ 0.28
		T3130	130 ~ 280	0.1 ~ 0.25	180 ~ 280	0.1 ~ 0.28
		UX30	80 ~ 130	0.1 ~ 0.2	100 ~ 150	0.1 ~ 0.28
	Die steels < 30 HRC	GH330	100 ~ 150	0.1 ~ 0.18	100 ~ 150	0.1 ~ 0.2
		UX30	80 ~ 130	0.1 ~ 0.18	80 ~ 130	0.1 ~ 0.2
M	Stainless steels < 250 HB	GH330	150 ~ 200	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		UX30	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.25

For ML-chipbreaker inserts (Sharpness-priority)

ISO	Workpiece material	Grade	Roughing (Depth of cut: *ap* > 1.5 mm)		Finishing (Depth of cut: *ap* = 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	GH330	130 ~ 230	0.05 ~ 0.17	150 ~ 250	0.05 ~ 0.2
		AH330	130 ~ 370	0.05 ~ 0.17	150 ~ 400	0.05 ~ 0.2
	Carbon steels Alloy steels < 300 HB	GH330	150 ~ 180	0.05 ~ 0.12	150 ~ 200	0.05 ~ 0.15
M	Stainless steels < 250 HB	GH330	150 ~ 200	0.05 ~ 0.12	200 ~ 250	0.05 ~ 0.15

For MH-chipbreaker inserts (Toughness-priority)

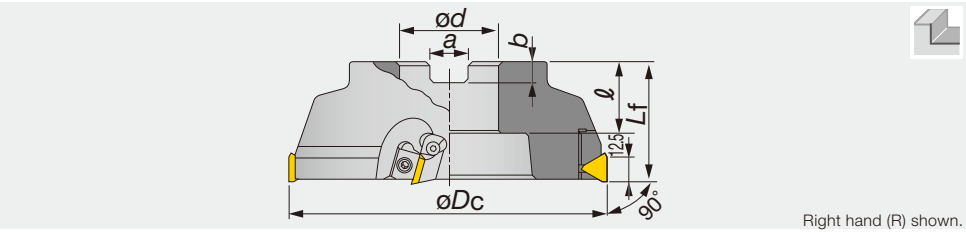
ISO	Workpiece material	Grade	Roughing (Depth of cut: *ap* > 1.5 mm)		Finishing (Depth of cut: *ap* = 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	GH330	100 ~ 230	0.15 ~ 0.3	130 ~ 250	0.15 ~ 0.35
		T3130	130 ~ 300	0.15 ~ 0.33	180 ~ 300	0.15 ~ 0.38
		UX30	100 ~ 180	0.15 ~ 0.3	130 ~ 200	0.15 ~ 0.35
	Carbon steels Alloy steels < 300 HB	GH330	100 ~ 180	0.15 ~ 0.24	130 ~ 200	0.15 ~ 0.35
		T3130	130 ~ 280	0.15 ~ 0.3	180 ~ 280	0.15 ~ 0.35
		UX30	80 ~ 130	0.15 ~ 0.24	100 ~ 150	0.15 ~ 0.35
	Die steels < 30 HRC	GH330	100 ~ 150	0.15 ~ 0.22	100 ~ 150	0.15 ~ 0.28
		UX30	80 ~ 130	0.15 ~ 0.22	80 ~ 130	0.15 ~ 0.28
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.15 ~ 0.24	100 ~ 200	0.15 ~ 0.3
		UX30	80 ~ 130	0.15 ~ 0.24	80 ~ 130	0.15 ~ 0.3

Notes:
- As a rule, dry cutting (or air-blowing) is generally recommended.
- If a cutting fluid is used, the cutting speed should be set to the lower side of the values shown in the above table.
- When being used in square shoulder milling, climb milling is recommended.
- In square shoulder milling of stainless steel, when chips tend to be recut during cutting, change to up-milling mode.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.

TSE3000R

Square shoulder mills with wedge clamped high-posi triangle inserts

A.R.= +17°, R.R.= +5°



Right hand (R) shown.

Designation	Max. ap	øDc	z	Lf	ød	ℓ	a	b	Kg	Insert
TSE3050R-E	8	50	3	40	22	20	10.4	6.3	0.3	TE*N32/TEKR1603...
TSE3063R-E	8	63	3	40	22	20	10.4	6.3	0.5	TE*N32/TEKR1603...
TSE3003RIA-E	8	80	4	50	27	26	12.4	7	1	TE*N32/TEKR1603...
TSE3004RIA-E	8	100	6	63	32	32	14.4	8	2	TE*N32/TEKR1603...

Note: TSE3050R-E and TSE3063R-E are not irregular pitch spec.

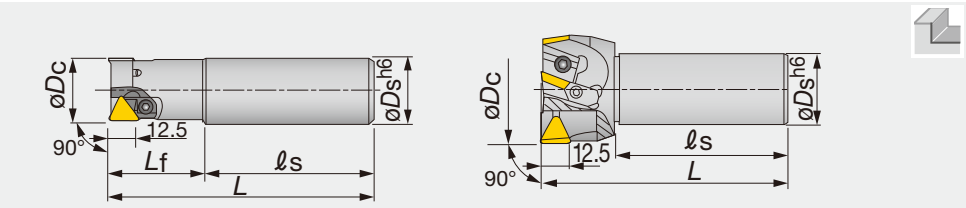
SPARE PARTS

Designation	①Clamp set	②Locator	③Screw	④Wedge	⑤Right-left screw	Wrench	Wrench 1
TSE3050R..., 63R...	CSL-4	-	-	-	-	-	P-3
TSE300*RIA-E	-	LE303R	CM4X0.7X12	WF330R	FDS-8S	TP-4	-

ESE3000R

Square shoulder endmills with wedge clamped high-posi triangle inserts

A.R.= +17°, R.R.= +5°



Right hand (R) shown.

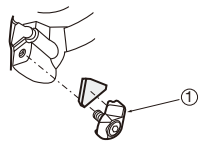
Designation	Max.ap	øDc	z	øDs	ℓs	Lf	L	Insert
ESE3020R	8	20	1	20	70	30	100	TE*N32/TEKR1603...
ESE3025R	8	25	1	25	80	35	115	TE*N32/TEKR1603...
ESE3030R	8	30	2	32	80	45	125	TE*N32/TEKR1603...
ESE3035R	8	35	2	32	80	45	125	TE*N32/TEKR1603...
ESE3040R	8	40	2	32	80	45	125	TE*N32/TEKR1603...
ESE3050R	8	50	3	32	80	-	115	TE*N32/TEKR1603...
ESE3063R	8	63	4	32	80	-	115	TE*N32/TEKR1603...

Note: The TAC Endmills shown above are not irregular pitch spec.

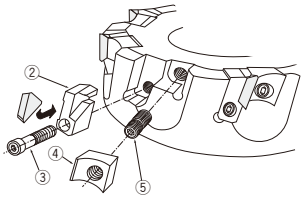
SPARE PARTS

Designation	Clamp set	Locator	Right-left screw	Shell locking bolt	Wedge	Wrench	Wrench 1
ESE3020 - 50R	CSL-4	-	-	-	-	-	P-3
ESE3063R	-	LE302R	DS-8S	SHCM4-10	WP302R	TP-4	-

TSE3050R ~ 3063R-E
ESE3020R ~ 3040R



TSE3003RIA-E, 3004RIA-E
ESE3050R ~ 3063R

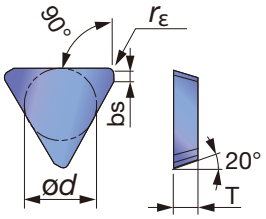


Reference pages

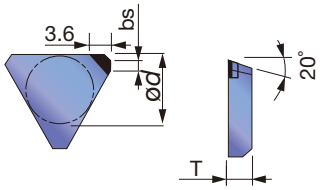
Inserts → **D110**, Standard cutting conditions → **D111**

INSERT

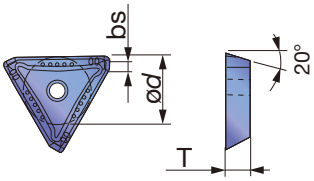
TECN/TEEN 32Z



TECN32ZFR-DIA



TEKR16-MS



		Coated								Cermet			Uncoated			PCD	
P	Steel	★			☆	☆		★		★	★		☆				
M	Stainless		★	★													
K	Cast iron	★					★										
N	Non-ferrous													★		★	
S	Superalloys	★	☆														
H	Hard materials																

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740	N308	UX30	TH10	DX140	ød	T	bs
TECN32ZFR	-	8											●		9.525	3.18	1.37
TECN32ZTR	0.8	8								●	●	●			9.525	3.18	1
TEEN32ZFR	-	8											●		9.525	3.18	1.37
TEEN32ZTR	0.8	8	●	●	●	●	●	●	●	●	●	●			9.525	3.18	1
TECN32ZFR-DIA	-	2.5												●	9.525	3.18	1.37
TEKR1603PEPR-MS	-	8			●										9.525	3.18	1.49

Note: T-DIA is trade name for Tungaloy's PCD grade. Available in one-corner type.

●: Line up
DX140 : Packing Quantity = 1 pc.

Reference pages

Standard cutting conditions → **D111**

STANDARD CUTTING CONDITIONS

Applied to cutter dia. ≤ ø40 mm

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	T3130	60 ~ 180	0.05 ~ 0.2
		NS740 · N308	60 ~ 150	0.05 ~ 0.15
		AH130 · GH330 · UX30	60 ~ 130	0.05 ~ 0.2
	Carbon steels Alloy steels < 300 HB	T3130	60 ~ 150	0.05 ~ 0.18
		UX30 · AH120	60 ~ 130	0.05 ~ 0.18
		NS740 · N308	60 ~ 130	0.05 ~ 0.15
	Die steels < 30 HRC	T3130 · UX30 · AH120	80 ~ 130	0.05 ~ 0.2
		NS740 · N308	60 ~ 130	0.05 ~ 0.15
M	Stainless steels < 250 HB	AH130 · AH140	100 ~ 180	0.08 ~ 0.2
		AH120 · GH330	100 ~ 200	0.08 ~ 0.2
		TU40	80 ~ 130	0.08 ~ 0.2
K	Cast irons	T1115	100 ~ 150	0.05 ~ 0.2
N	Aluminium alloys	TH10	200 ~ 400	0.05 ~ 0.2
S	Titanium alloys Ti-6Al-4V, etc.	AH130	20 ~ 60	0.05 ~ 0.15
	Heat-resistant alloys Inconel 718, etc.	AH120	20 ~ 40	0.05 ~ 0.1

Applied to cutter dia. ≥ ø50 mm

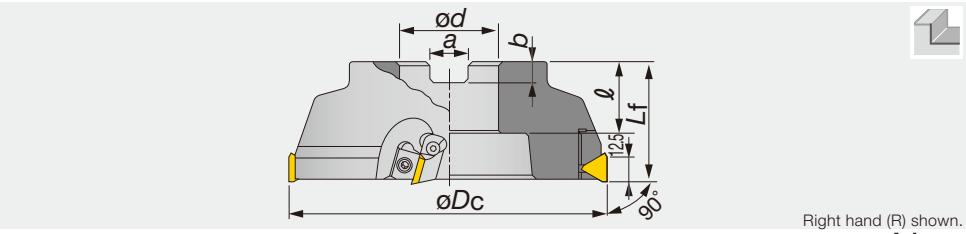
ISO	Workpiece material	Grade	Roughing (Depth of cut: > 1.5 mm)		Finishing (Depth of cut: 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	AH120 · GH330	130 ~ 230	0.1 ~ 0.2	130 ~ 250	0.1 ~ 0.23
		T3130	130 ~ 300	0.1 ~ 0.23	150 ~ 300	0.1 ~ 0.25
		NS740 · N308	130 ~ 200	0.1 ~ 0.18	150 ~ 250	0.1 ~ 0.2
		UX30 · AH130	100 ~ 180	0.1 ~ 0.2	130 ~ 200	0.1 ~ 0.23
	Carbon steels Alloy steels < 300 HB	AH120 · GH330	100 ~ 200	0.1 ~ 0.18	130 ~ 230	0.1 ~ 0.2
		T3130	130 ~ 280	0.1 ~ 0.2	180 ~ 280	0.1 ~ 0.23
		NS740 · N308	100 ~ 150	0.1 ~ 0.15	150 ~ 200	0.1 ~ 0.18
		UX30	80 ~ 130	0.1 ~ 0.18	100 ~ 150	0.1 ~ 0.2
	Die steels < 30 HRC	T3130 · AH120	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		UX30	80 ~ 130	0.1 ~ 0.15	80 ~ 130	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	80 ~ 180	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		AH120 · GH330	150 ~ 200	0.1 ~ 0.18	200 ~ 250	0.1 ~ 0.25
K	Cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.2
		TH10	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.25
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.25	350 ~ 1000	0.1 ~ 0.25
		DX140	200 ~ 1000	0.05 ~ 0.15	350 ~ 1000	0.1 ~ 0.2
	Copper alloys	TH10	200 ~ 500	0.1 ~ 0.15	200 ~ 500	0.1 ~ 0.2
S	Titanium alloys Ti-6Al-4V, etc.	AH130	20 ~ 60	0.05 ~ 0.15	20 ~ 60	0.05 ~ 0.15
	Heat-resistant alloys Inconel 718, etc.	AH120	20 ~ 40	0.05 ~ 0.1	20 ~ 40	0.05 ~ 0.1

Note:
- Dry cutting is recommended except for aluminium alloys
- Maximum depth of cut for TECN32ZFR-DIA is 2.5 mm.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.

TSE4000RIA

Square shoulder mills with wedge clamped high-posi triangle inserts

A.R.= +17°, R.R.= +5°

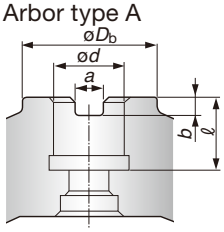


Right hand (R) shown.

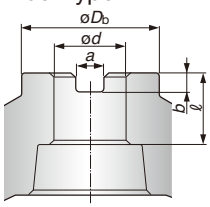
Designation	Max. ap	øDc	z	Lf	ød	ℓ	a	b	Kg	Insert	Arbor type
TSE4003RIAE	8	50	3	40	22	20	10	6	0.3	TE*N43/TEKR2204...	A
TSE4004RIAE	8	50	3	40	22	20	10.4	6.3	0.3	TE*N43/TEKR2204...	A
TSE4005RIAE	8	63	3	40	22	20	10	6	0.5	TE*N43/TEKR2204...	B
TSE4006RIAE	8	63	3	40	22	20	10.4	6.3	0.5	TE*N43/TEKR2204...	B

Arbor type

Arbor type A

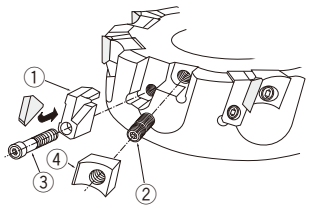


Arbor type B



SPARE PARTS

Designation	①Locator	②Right-left screw	③Locator fixing screw	Shell locking bolt	④Wedge	Wrench
TSE4003RIAE	LE403R	FDS-8S	CM4X0.7X14	-	WF330N	TP-4
TSE4004RIAE	LE403R	FDS-8S	CM4X0.7X14	-	WF330N	TP-4
TSE4005RIAE	LE405R	FDS-8S	CM4X0.7X14	-	WF500R	TP-4
TSE4006RIAE	LE405R	FDS-8S	CM4X0.7X14	-	WF500R	TP-4



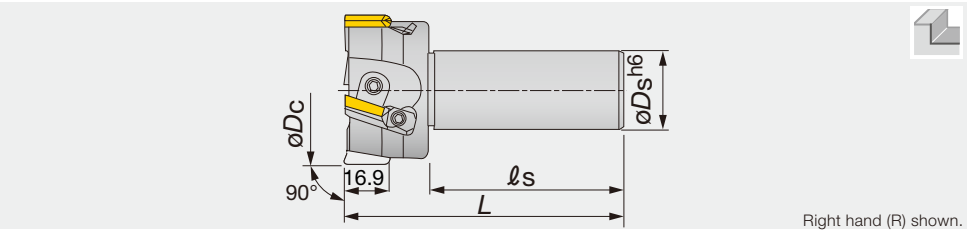
Reference pages

Inserts → **D113**, Standard cutting conditions → **D114**

ESE4000R

Square shoulder endmills with wedge clamped high-posi triangle inserts

A.R. = +17°, R.R. = +1° ~ +4°



Designation	Max. ap	øDc	z	øDs	ℓs	L	Insert
ESE4050RA	10	50	3	32	80	115	TE*N43/TEKR2204...
ESE4063RA	10	63	4	32	80	115	TE*N43/TEKR2204...
ESE4003RIA-S32	10	80	4	32	80	120	TE*N43/TEKR2204...

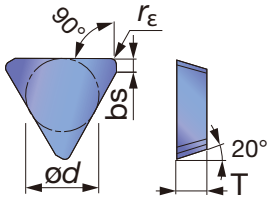
Note: TSE4050RA and TSE4063RA are not irregular pitch spec.

SPARE PARTS

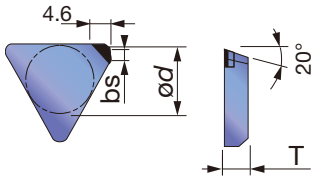
Designation	Locator	Right-left screw	Locator fixing screw	Shell locking bolt	Wedge	Wrench
ESE4050RA	LE402AR	DS-8S	-	SHCM4-10	WT402R	TP-4
ESE4063RA	LE402AR	DS-8	-	SHCM4-10	WT402R	TP-4
ESE4003RIA-S32	LE403R	FDS-8S	CM4X0.7X14	-	WF330N	TP-4

INSERT

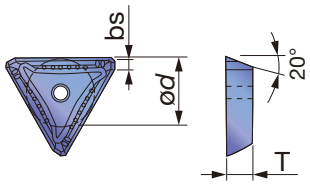
TECN/TEEN 43Z



TECN43ZFR-DIA



TEKR22-MS



		Coated							Cermet		Uncoated		PCD
		AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740	N308	UX30	TH10	DX140
P	Steel	☆		☆	☆	☆		★	★	★	☆		
M	Stainless	☆	★	★									
K	Cast iron	★					★					☆	
N	Non-ferrous											★	★
S	Superalloys	☆	☆										
H	Hard materials												

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740	N308	UX30	TH10	DX140	ød	T	bs
TECN43ZFR	1	10											●		12.7	4.76	2
TECN43ZTR	1	10								●	●	●			12.7	4.76	1.31
TEEN43ZFR	1	10											●		12.7	4.76	2
TEEN43ZTR	1	10	●	●	●	●	●	●	●	●	●	●			12.7	4.76	1.31
TECN43ZFR-DIA	-	3.5												●	12.7	4.76	2
TEKR2204PEPR-MS	-	10			●										12.7	4.76	1.8

Note: T-DIA is trade name for Tungaloy's PCD grade. Available in one-corner type

●: Line up
DX140 : Packing Quantity = 1 pc.

Reference pages

Standard cutting conditions → **D114**

STANDARD CUTTING CONDITIONS

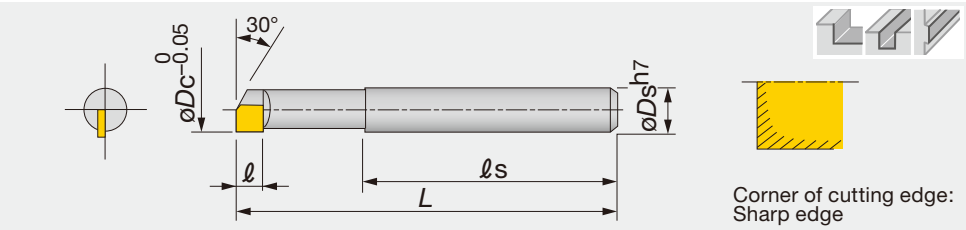
ISO	Workpiece material	Grade	Roughing (Depth of cut *ap*: > 1.5 mm)		Finishing (Depth of cut *ap*: 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	AH330	130 ~ 370	0.1 ~ 0.2	150 ~ 400	0.1 ~ 0.23
		AH120 · GH330	130 ~ 230	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.23
		T3130	130 ~ 300	0.1 ~ 0.23	180 ~ 300	0.1 ~ 0.25
		NS740 · N308	130 ~ 200	0.1 ~ 0.18	150 ~ 250	0.1 ~ 0.2
		UX30 · AH140	100 ~ 180	0.1 ~ 0.2	130 ~ 200	0.1 ~ 0.23
	Carbon steels Alloy steels < 300 HB	AH330	100 ~ 300	0.1 ~ 0.18	150 ~ 320	0.1 ~ 0.2
		AH120 · GH330	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.2
		T3130	130 ~ 280	0.1 ~ 0.2	180 ~ 280	0.1 ~ 0.23
		AH140	80 ~ 130	0.1 ~ 0.18	100 ~ 200	0.1 ~ 0.18
		NS740 · N308	100 ~ 150	0.1 ~ 0.15	150 ~ 200	0.1 ~ 0.18
		UX30	80 ~ 130	0.1 ~ 0.18	100 ~ 150	0.1 ~ 0.2
	Die steels < 30 HRC	AH330	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
		T3130 · AH120 · GH330	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		UX30	80 ~ 130	0.1 ~ 0.15	80 ~ 130	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	80 ~ 180	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		AH120	150 ~ 200	0.1 ~ 0.18	200 ~ 250	0.1 ~ 0.25
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		TH10	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.25
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.25	350 ~ 1000	0.1 ~ 0.25
		DX140	200 ~ 1000	0.05 ~ 0.15	350 ~ 1000	0.1 ~ 0.2
	Copper alloys	TH10	200 ~ 500	0.1 ~ 0.15	200 ~ 500	0.1 ~ 0.2
S	Titanium alloys Ti-6Al-4V, etc.	AH130	20 ~ 60	0.05 ~ 0.15	20 ~ 60	0.05 ~ 0.15
	Heat-resistant alloys Inconel 718, etc.	AH120	20 ~ 40	0.05 ~ 0.1	20 ~ 40	0.05 ~ 0.1

Note:
- Dry cutting is recommended for all materials except for aluminium alloys.
- Maximum depth of cut for TECN43ZFR-DIA is 3.5 mm.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.

- No. of revolutions (min^{-1}) = Cutting speed × 1000 ÷ 3.14 ÷ Cutter diameter
- Table feed (mm/min) = No. of revolutions × Feed per tooth × No. of inserts

DEB1000

T-DIA Endmill



Designation	DX140	Z	øDc	øDs	ℓ	ℓs	L
DEB1040	●	1	4	6	3.5	32	45
DEB1050	●	1	5	6	3.5	35	50
DEB1060	●	1	6	6	3.5	35	50
DEB1080	●	1	8	8	5	37	55
DEB1100	●	1	10	10	5	40	60
DEB1120	●	1	12	12	5	45	65

●: Line up

Notes:
- As cutting edge is very sharp, please handle carefully.
- Please keep the overhang length from milling chuck of tool as short as possible.

STANDARD CUTTING CONDITIONS

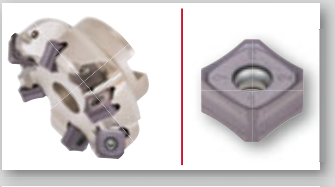
DEB1000

For side milling $a_p \leq 3D$, $a_e = 0.1$ mm

ISO	Workpiece material	Mill dia. (mm)	Cutting Speed V_c (m/min)	No. of revolutions n (min^{-1})	Table feed V_f (mm/min)
N	Aluminium alloys, Copper alloys	ø4	120 - 180	12,000	120
		ø5	120 - 180	9,600	120
		ø6	120 - 180	8,000	120
		ø8	120 - 180	6,000	120
		ø10	120 - 180	4,800	120
		ø12	120 - 180	4,000	100

- Set the protrusion length as short as possible. Reduce number of revolutions and table feed in order to prevent chattering when the protrusion length is long.
- Use the machine with high rigidity.
- Adjust the number of revolutions and the table feed according to the situation of use. (depth of cut or machine rigidity etc.)

MillLine - Face Milling



DOTRIPLEMILL — D118

Face milling cutters with double-sided square, octagonal, and round inserts

45° ø50 - ø160 mm
max. ap 6 mm

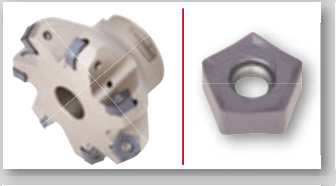
P M K S H

DOOCTO / DOQUAD — D121

Face milling cutters with screw-on and wedge clamping systems featuring 4 types of inserts for a broader application range

45° ø63 - ø315 mm
max. ap 7.5 mm

P M K S H

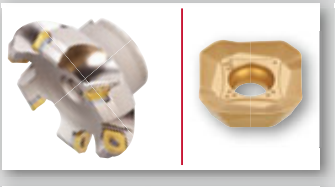


DOPENT — D127

Economical, double-sided inserts with 10 cutting edges for general-purpose milling

70° ø32 - ø160 mm
max. ap 6.4 mm

P M K N S

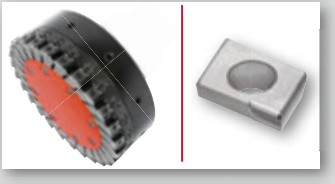


TUNGMILL — D131

Single-sided inserts with low cutting force for face milling

45° ø25 - ø160 mm
max. ap 5 mm

P M K N

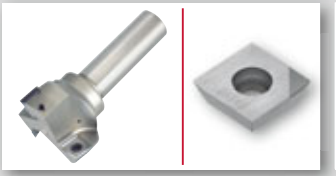


TUNGSPEEDMILL — D136

Incredibly productive high-speed machining with PCD inserts

90° ø25 - ø125 mm
max. ap 11 mm

N



EFE — D138

Lightweight cutters with screw clamping system suitable for low-rigid machines

85° ø50 mm
max. ap 8 mm

P M K N

EDPD — D141

Lightweight cutters in wedge clamping design with PCD inserts

90° ø63 mm
max. ap 8 mm

N

ISO Milling — D144

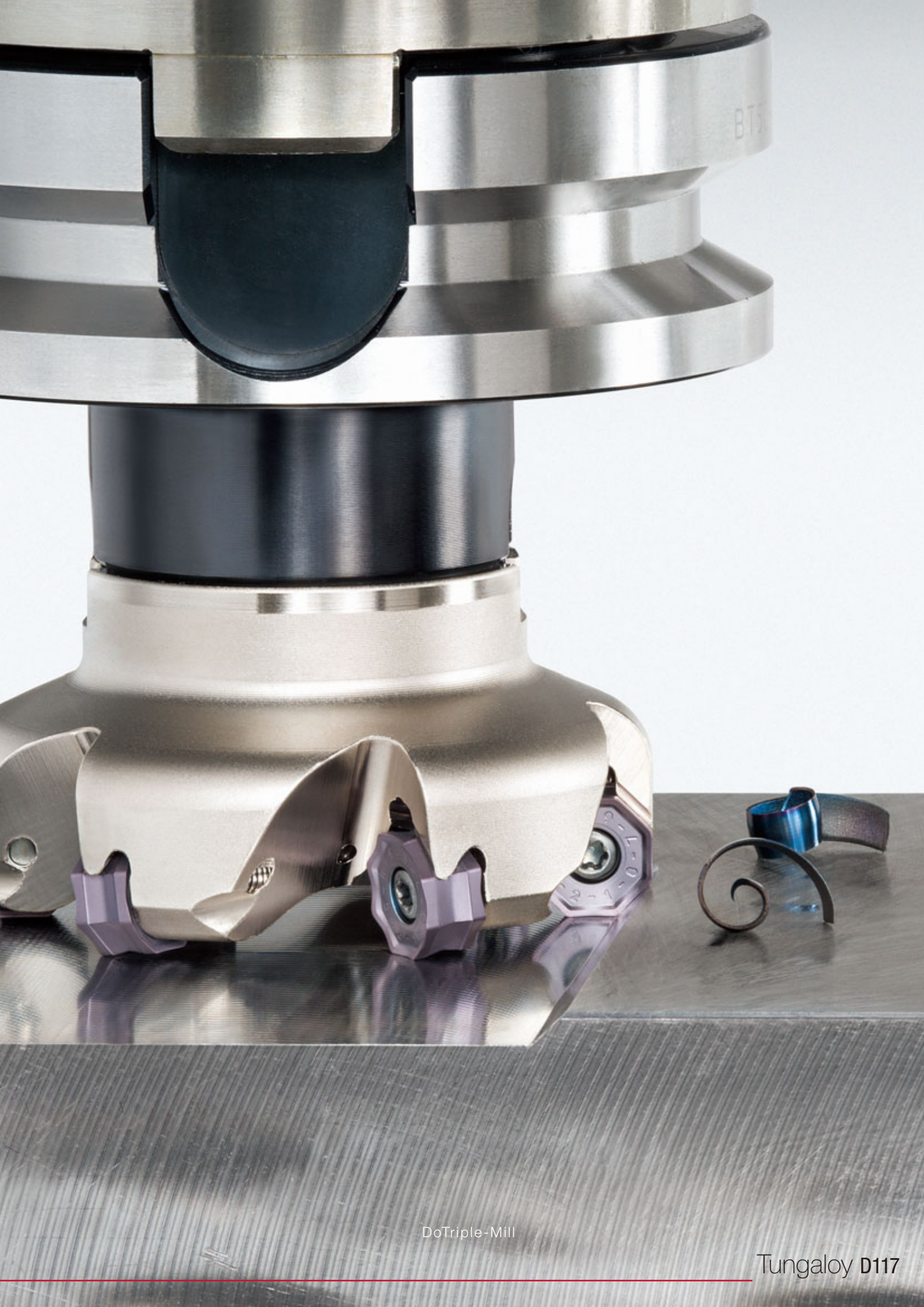
45° - T/EME4400, EMD4400, TMD5400, EGD
75° - TGP4100, TGN4200-A
Clamping systems - S-TAQ, QC System

Milling Tools with Round Inserts — D162

ERD6000, T/ERF6000

Milling Tools for Finishing — D166

EMS, S/EFP4000

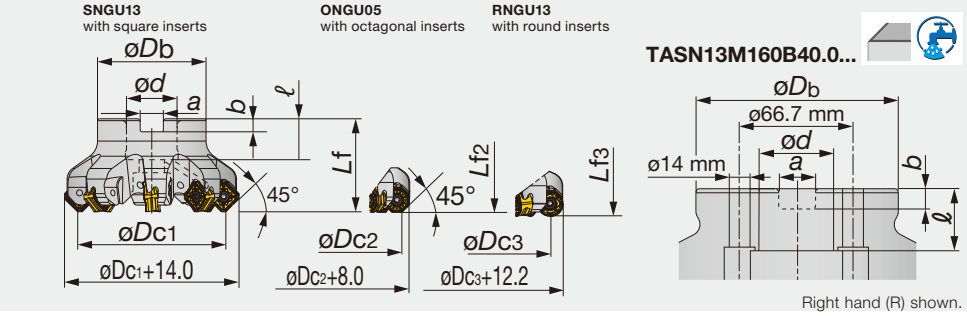


DoTriple-Mill

TASN13

45° face milling cutter to seat double sided square, octagonal, round insert

A.R.=+6.0°,R.R.=-6.8°~-6.3°



Right hand (R) shown.

Designation	øDc1	øDc2	øDc3	z	øDb	Lf1	Lf2	Lf3	ød	ℓ	a	b	Kg	Air hole
TASN13M050B22.0R04	50	53	48.7	4	41	40	38.5	38.5	22	20	10.4	6.3	0.4	with
TASN13M050B22.0R05	50	53	48.7	5	41	40	38.5	38.5	22	20	10.4	6.3	0.4	with
TASN13M063B22.0R05	63	66	61.7	5	47	40	38.5	38.5	22	20	10.4	6.3	0.7	with
TASN13M063B22.0R06	63	66	61.7	6	47	40	38.5	38.5	22	20	10.4	6.3	0.6	with
TASN13M063B22.0R08	63	66	61.7	8	47	40	38.5	38.5	22	20	10.4	6.3	0.6	with
TASN13M080B27.0R05	80	83	78.7	5	58	50	48.5	48.5	27	22	12.4	7	1.1	with
TASN13M080B27.0R08	80	83	78.7	8	58	50	48.5	48.5	27	22	12.4	7	1.1	with
TASN13M080B27.0R10	80	83	78.7	10	58	50	48.5	48.5	27	22	12.4	7	1.2	with
TASN13M100B32.0R06	100	103	98.7	6	60	50	48.5	48.5	32	28.5	14.4	8	1.4	with
TASN13M100B32.0R08	100	103	98.7	8	60	50	48.5	48.5	32	28.5	14.4	8	1.4	with
TASN13M100B32.0R12	100	103	98.7	12	60	50	48.5	48.5	32	28.5	14.4	8	1.4	with
TASN13M125B40.0R07	125	128	123.7	7	71	63	61.5	61.5	40	32	16.4	9	2.2	with
TASN13M125B40.0R10	125	128	123.7	10	71	63	61.5	61.5	40	32	16.4	9	2.3	with
TASN13M125B40.0R14	125	128	123.7	14	71	63	61.5	61.5	40	32	16.4	9	2.5	with
TASN13M160B40.0R08	160	163	158.7	8	100	63	61.5	61.5	40	29	16.4	9	4.1	without
TASN13M160B40.0R12	160	163	158.7	12	100	63	61.5	61.5	40	29	16.4	9	4.2	without

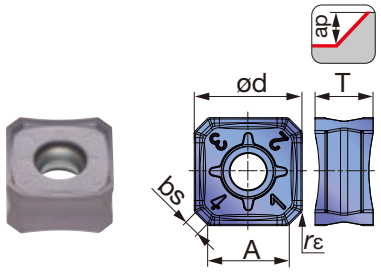
SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Center bolt 1	Torx bit
TASN13M0**B22.0R...	CSPB-4	H-TB2W	M-1000	-	CM10X30H	BLDIP15/S7
TASN13M080B27.0R...	CSPB-4	H-TB2W	M-1000	-	CM12X30H	BLDIP15/S7
TASN13M100B32.0R...	CSPB-4	H-TB2W	M-1000	TMBA-M16H	-	BLDIP15/S7
TASN13M125B40.0R...	CSPB-4	H-TB2W	M-1000	TMBA-M20H	-	BLDIP15/S7
TASN13M160B40.0R...	CSPB-4	H-TB2W	M-1000	-	-	BLDIP15/M7

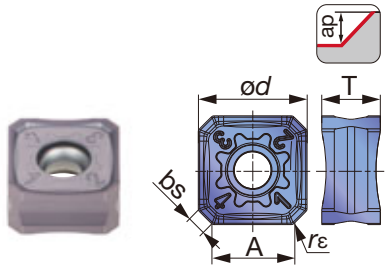
Reference pages

Inserts → **D119**, Standard cutting conditions → **D120**

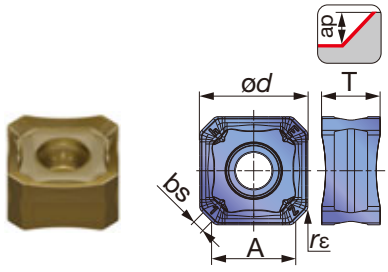
SNMU-MJ



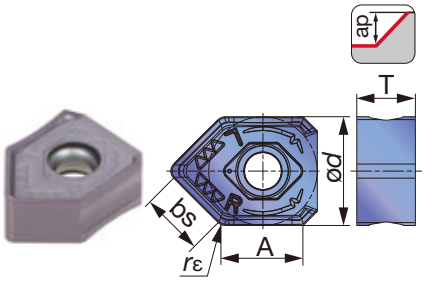
SNGU-MJ



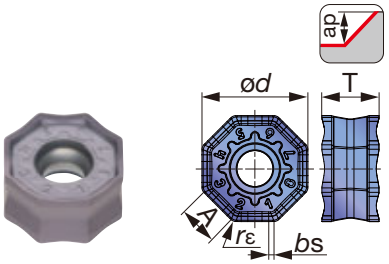
SNGU-MH



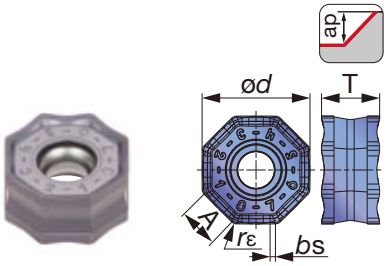
SNGU-W



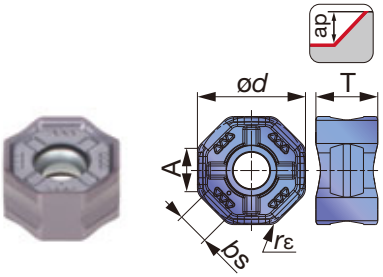
ONMU-MJ



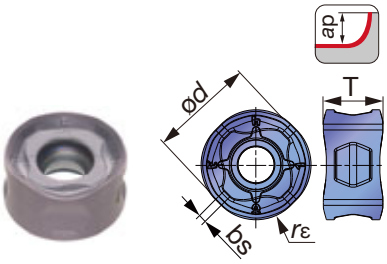
ONGU-MJ



ONGU-W



RNMU-MJ



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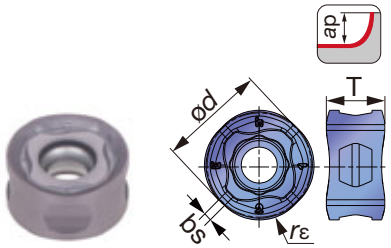
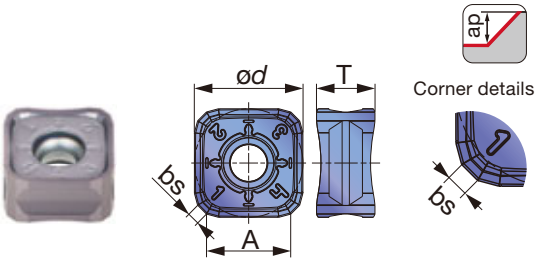


SNGU#C-MJ



P	Steel	☆	★	★	
M	Stainless		★	★	
K	Cast iron	★			★
N	Non-ferrous				
S	Superalloys	★	☆		
H	Hard materials	☆	☆		

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	AH3135	T3225	T1215	A	ød	T	bs
SNMU1307ANEN-MJ	0.5	6	●	●	●	●	9.4	13	7	2
SNGU1307ANEN-MJ	0.5	6	●	●	●		9.4	13	7	2
SNGU1307ANEN-MH	0.8	6			●		9	13	7	2
SNGU1307ANEN-W	1.2	6	●	●			9.6	13	7	7.5
ONMU0507ANEN-MJ	0.8	3.4	●	●	●	●	4.9	13	7	0.7
ONGU0507ANEN-MJ	0.8	3.4	●	●	●		4.9	13	7	0.7
ONGU0507ANEN-W	1.6	3.4	●	●			5	13	7.44	3.9
RNMU1307ZNER-MJ	6	6	●	●	●	●	-	13	7.1	1
RNGU1307ZNER-MJ	6	6	●	●			-	13	7.1	1

STANDARD CUTTING CONDITIONS

SNGU13/ONGU05

ISO	Workpiece materials		Hardness	Priority	Grades	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel C15, etc.		200 - 300HB	First choice	AH3135	MJ	100 - 250	0.1 - 0.5
				For wear resistance	T3225	MJ	200 - 350	0.1 - 0.4
	High carbon and alloy steel C55, 2CrMo4, etc.		150 - 300HB	First choice	AH3135	MJ	100 - 250	0.1 - 0.4
				For wear resistance	T3225	MJ	180 - 300	0.1 - 0.4
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	AH3135	MJ	100 - 200	0.1 - 0.4
				For wear resistance	T3225	MJ	150 - 250	0.1 - 0.4
M	Stainless steel X5CrNi18-9, X5CrNiMo17-12-3, etc.		- 200HB	First choice	AH3135	MJ	100 - 200	0.1 - 0.35
				For wear resistance	T3225	MJ	100 - 250	0.1 - 0.3
	Stainless cast steel GX40NiCrSiNb38-19, etc.		-	First choice	T3225	MH	60 - 120	0.1 - 0.3
				For low cutting force	AH3135	MJ	60 - 120	0.1 - 0.3
K	Gray cast iron 250, etc.		150 - 250 HB	First choice	T1215	MJ	100 - 300	0.1 - 0.4
					AH120	MJ	100 - 250	0.1 - 0.5
	Ductile cast iron 400-15, 600-3, etc.		150 - 250 HB	First choice	T1215	MJ	100 - 300	0.1 - 0.4
					AH120	MJ	80 - 200	0.1 - 0.5
S	Titanium alloys Ti-6Al-4V, etc.		- 40HRC	First choice	AH3135	MJ	30 - 60	0.1 - 0.3
	Heat-resistant alloys Inconel718, etc.		- 40HRC	First choice	AH120	MJ	10 - 40	0.05 - 0.15
H	Hardened steel	X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	MJ	80 - 130	0.1 - 0.2
		X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	50 - 70	0.03 - 0.1

RNGU13

ISO	Workpiece materials		Hardness	Priority	Grades	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel C15 etc.		200 - 300 HB	First choice	AH3135	MJ	100 - 250	※*ap* = 6 mm: 0.1 - 0.3 ※*ap* = 2 mm: 0.4 - 0.8 ※*ap* = 1 mm: 0.8 - 1.5
				For wear resistance	T3225	MJ	200 - 350	
	High carbon and alloy steel C55, 42CrMo4, etc.		150 - 300 HB	First choice	AH3135	MJ	100 - 250	
				For wear resistance	T3225	MJ	180 - 300	
	Prehardened steel NAK80, PX5 etc.		30 - 40 HRC	First choice	AH3135	MJ	100 – 200	
				For wear resistance	T3225	MJ	150 - 250	
M	Stainless steel X5CrNi18-9, X5CrNiMo17-12-3, etc.		- 200 HB	First choice	AH3135	MJ	100 - 200	※*ap* = 6 mm: 0.1 - 0.25 ※*ap* = 2 mm: 0.3 - 0.7 ※*ap* = 1 mm: 0.6 - 1.3
				For wear resistance	T3225	MJ	100 - 250	
	Stainless cast steel GX40NiCrSiNb38-19, etc.		-	First choice	T3225	MJ	60 - 120	※*ap* = 2 mm: 0.2 - 0.4 ※*ap* = 1 mm: 0.3 - 0.8
				For fracture resistance	AH3135	MJ	60 - 120	
K	Gray cast iron 250, etc.		150 - 250 HB	First choice	AH120	MJ	100 - 300	※*ap* = 6 mm: 0.1 - 0.3 ※*ap* = 2 mm: 0.4 - 0.8 ※*ap* = 1 mm: 0.8 - 1.5
					T1215	MJ	100 - 250	
	Ductile cast iron 400-15, 600-3, etc.		150 - 250 HB	First choice	AH120	MJ	100 - 300	
					T1215	MJ	80 - 200	
S	Titanium alloys Ti-6Al-4V, etc.		- 40 HRC	First choice	AH3135	MJ	30 - 60	*ap* = 1 mm: 0.15 – 0.8
	Heat-resistant alloys Inconel718, etc.		- 40 HRC	First choice	AH120	MJ	10 - 40	*ap* = 1 mm: 0.05 - 0.3
H	Hardened steel	X40CrMoV5-1, etc.	40 - 50 HRC	First choice	AH3135	MJ	80 - 130	*ap* = 1 mm: 0.1 - 0.25
		X153CrMoV12, etc.	50 - 60 HRC	First choice	AH120	MJ	50 - 70	*ap* = 0.5 mm: 0.03 - 0.1

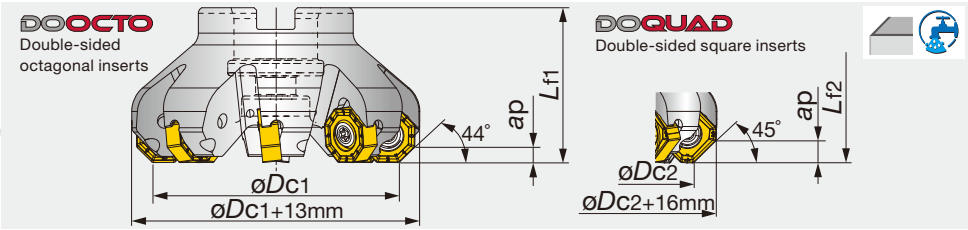
※When using T3225 or T1215, decrease the feed per tooth (*fz*) to 80% of the abovementioned value.

DOOCTO DOQUAD

TAN07

45° screw clamp type face mills with double sided octagonal or square inserts

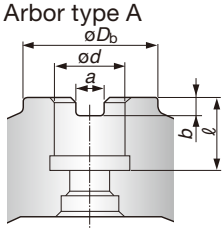
A.R.=-6°,R.R.=+15.5°



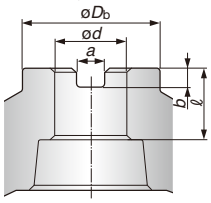
Designation	øDc1	øDc2	z	øDb	Lf1	Lf2	ød	ℓ	a	b	Kg	Air hole	Insert	Arbor type
TAN07R063M22.0E05	63	60.3	5	41	40	41.4	22	20	10.4	6.3	0.5	with	SN*U/ON*U/OWMT...	A
TAN07R063M22.0E06	63	60.3	6	41	40	41.4	22	20	10.4	6.3	0.5	with	SN*U/ON*U/OWMT...	A
TAN07R080M27.0E06	80	77.3	6	50	50	51.4	27	22	12.4	7	1	with	SN*U/ON*U/OWMT...	A
TAN07R080M27.0E08	80	77.3	8	50	50	51.4	27	22	12.4	7	1	with	SN*U/ON*U/OWMT...	A
TAN07R100M32.0E07	100	97.3	7	60	50	51.4	32	28.5	14.4	8	1.5	with	SN*U/ON*U/OWMT...	B
TAN07R100M32.0E10	100	97.3	10	60	50	51.4	32	28.5	14.4	8	1.5	with	SN*U/ON*U/OWMT...	B
TAN07R125M40.0E08	125	122.3	8	71	63	64.4	40	29	16.4	9	2.5	with	SN*U/ON*U/OWMT...	B
TAN07R125M40.0E12	125	122.3	12	71	63	64.4	40	29	16.4	9	2.5	with	SN*U/ON*U/OWMT...	B
TAN07R160M40.0E10	160	157.3	10	100	63	64.4	40	29	16.4	9	4	without	SN*U/ON*U/OWMT...	D
TAN07R160M40.0E15	160	157.3	15	100	63	64.4	40	29	16.4	9	4	without	SN*U/ON*U/OWMT...	D
TAN07R200M60.0E12	200	197.3	12	135	63	64.4	60	38	25.7	14	6.5	without	SN*U/ON*U/OWMT...	C
TAN07R200M60.0E18	200	197.3	18	135	63	64.4	60	38	25.7	14	6.5	without	SN*U/ON*U/OWMT...	C
TAN07R250M60.0E15	250	247.3	15	130	63	64.4	60	38	25.7	14	9	without	SN*U/ON*U/OWMT...	C
TAN07R250M60.0E21	250	247.3	21	130	63	64.4	60	38	25.7	14	9	without	SN*U/ON*U/OWMT...	C
TAN07R315M60.0E18	315	312.3	18	220	80	81.4	60	38	25.7	14	18	without	SN*U/ON*U/OWMT...	E
TAN07R315M60.0E24	315	312.3	24	220	80	81.4	60	38	25.7	14	18	without	SN*U/ON*U/OWMT...	E

Arbor type

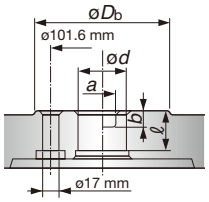
Arbor type A



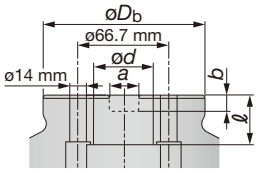
Arbor type B



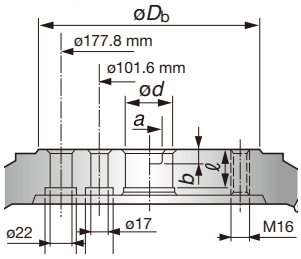
Arbor type C



Arbor type D

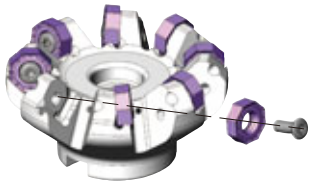


Arbor type E



SPARE PARTS

Designation	Clamping screw	Grip	Center bolt	Center bolt 1	Torx bit
TAN07R063M22.0...	SRM5X0.8IP20X+ACROLYTE	H-TB	-	CM10X30H	BLDIP20/S7
TAN07R080M27.0...	SRM5X0.8IP20X+ACROLYTE	H-TB	-	CM12X30H	BLDIP20/S7
TAN07R100M32.0...	SRM5X0.8IP20X+ACROLYTE	H-TB	TMBA-M16H	-	BLDIP20/S7
TAN07R125M40.0...	SRM5X0.8IP20X+ACROLYTE	H-TB	TMBA-M20H	-	BLDIP20/S7
TAN07R160 - 315...	SRM5X0.8IP20X+ACROLYTE	H-TB	-	-	BLDIP20/M7



Reference pages

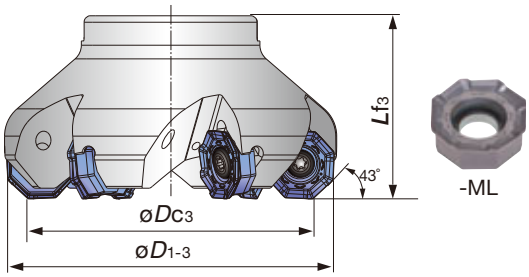
Inserts → **D124**, Standard cutting conditions → **D125**

Screw-on type

DOOCTO

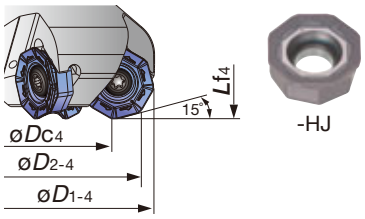
Cutter diameter and height with single sided octagonal insert

OWMT-ML insert



ap = 3.5 mm

OWMT-HJ insert



ap = 1.5 mm
(7.5 mm, with double corner use)

Designation	Dimensions (mm)						
	øDc3	øD1-3	øDc4	øD2-4	øD1-4	Lf3	Lf4
TAN07R063M...	63.5	76	55.7	67.2	76.4	41	41.4
TAN07R080M...	80.5	93	72.7	84.2	93.4	51	51.4
TAN07R100M...	100.5	113	92.7	104.2	113.4	51	51.4
TAN07R125M...	125.5	138	117.7	129.2	138.4	64	64.4
TAN07R160M...	160.5	173	152.7	164.2	173.4	64	64.4
TAN07R200M...	200.5	213	192.7	204.2	213.4	64	64.4
TAN07R250M...	250.5	263	242.7	252.2	263.4	64	64.4
TAN07R315M...	315.5	328	307.7	319.2	328.4	64	64.4

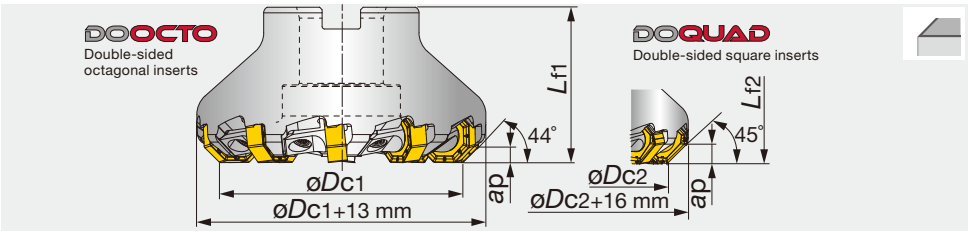
Note: OWMT08 inserts can be only used with screw on type cutters.

Reference pages

Inserts → **D124**, Standard cutting conditions → **D125**

TAN07-W

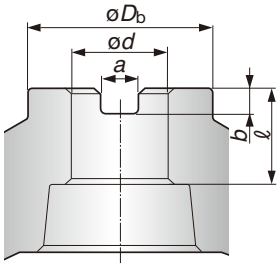
45° wedge clamp type face mills with double sided octagonal or square inserts.



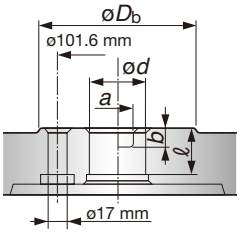
Designation	øDc1	øDc2	z	øDb	Lf1	Lf2	ød	ℓ	a	b	Kg	Air hole	Insert	Arbor type
TAN07R063M22.0E08W	63	60.3	8	41	40	41.4	22	20	10.4	6.3	0.6	without	SN*U/ON*U/OWMT...	B
TAN07R080M27.0E10W	80	77.3	10	50	50	51.4	27	25	12.4	7	1.1	without	SN*U/ON*U/OWMT...	B
TAN07R100M32.0E14W	100	97.3	14	60	50	51.4	32	28.5	14.4	8	1.6	without	SN*U/ON*U/OWMT...	B
TAN07R125M40.0E18W	125	122.3	18	71	63	64.4	40	29	16.4	9	2.5	without	SN*U/ON*U/OWMT...	B
TAN07R160M40.0E22W	160	157.3	22	100	63	64.4	40	29	16.4	9	3.6	without	SN*U/ON*U/OWMT...	D
TAN07R200M60.0E28W	200	197.3	28	135	63	64.4	60	39	25.7	14	5.8	without	SN*U/ON*U/OWMT...	C

Arbor type

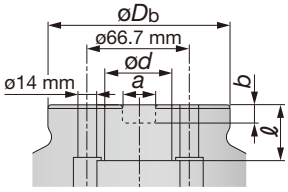
Arbor type B



Arbor type C



Arbor type D



SPARE PARTS

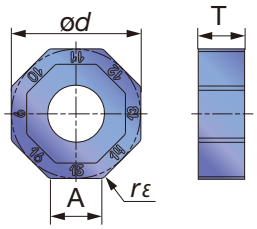
Designation	Grip	Locator	Clamping screw	Torx bit
TAN07-W	H-TBS	CLARM-10-TUNG1	DS-6P	BLDIP15/S7

Reference pages

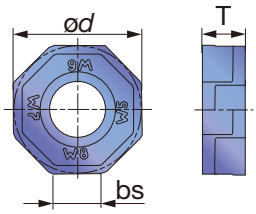
Inserts → **D124**, Standard cutting conditions → **D125**

INSERT

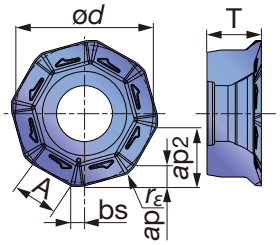
ONMU/ONHU0705-MJ / -ML



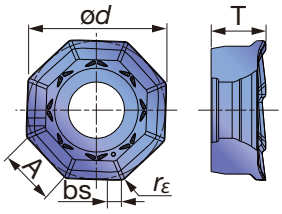
ONHU0705-W



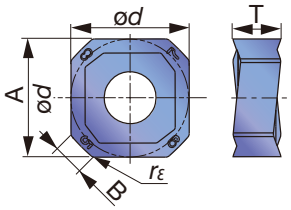
OWMT0807-HJ



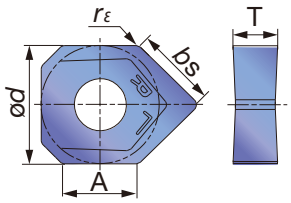
OWMT0807-ML



SNMU/SNHU1706 -MJ / -ML



SNHU1706-W



P	Steel			☆	★	★			
M	Stainless		☆			★			
K	Cast iron	★			☆			★	
N	Non-ferrous								
S	Superalloys		☆			☆			
H	Hard materials					☆			

★ : First choice
☆ : Second choice

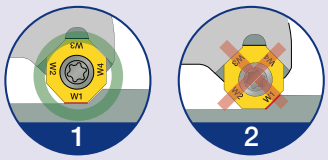
Designation	rε	Max. ap	Coated								ød	T	B	ød	bs	Max. ap2.
			AH120	AH130	AH140	AH725	AH3135	T1115	T1215							
ONMU0705ANPN-MJ	0.8	4.75			●	●	●	●	●		7.2	6.2	-	17.3	-	-
ONHU0705ANPN-MJ	0.8	4.75			●	●					7.2	6.2	-	17.3	-	-
ONMU0705ANPN-ML	0.8	4.75	●				●				7.2	6.2	-	17.3	-	-
ONHU0705ANTN-ML	0.8	4.75	●		●	●					7.2	6.2	-	17.3	-	-
ONHU0705ANPR-W *	-	4.75	●								7.2	5.8	-	17.5	6.4	-
OWMT0807ZNER-HJ	1.2	1.5					●				-	7.4	-	19	1	7.5
OWMT0807AAER-ML	0.8	3.5		●			●				5.2	7.4	-	-	1.2	-
SNMU1706ANPR-MJ	0.8	7.5			●	●	●		●		11	6.98	4.4	17.3	1.8	-
SNHU1706ANPR-MJ	0.8	7.5			●	●					11	6.98	4.4	17.3	1.8	-
SNMU1706ANTR-ML	0.8	7.5	●				●				11	6.98	4.4	17.3	1.8	-
SNHU1706ANTR-ML	0.8	7.5	●								11	6.98	4.4	17.3	1.8	-
SNHU1706ANFN-W *	0.4	7.5	●								17.3	6.5	-	17.3	11	-

* Pay attention to the wiper insert installation procedure below.

●: Line up

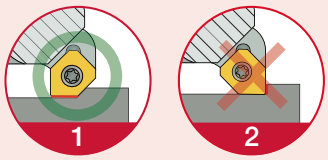
Attention for wiper inserts

DOOCTO



Attach only one wiper insert on the cutter and make sure the wiper edge faces the machining surface.
Feed rate: f < 5.5 mm/rev

DOQUAD



Attach only one wiper insert on the cutter and make sure the wiper edge faces the machining surface.
Feed rate: f < 9.5 mm/rev

STANDARD CUTTING CONDITIONS

Double-sided inserts

ISO	Workpiece material	Hardness	Priority	Recommendation		Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
				Grade	Chipbreaker		
P	Low carbon steel C15E, etc.	- 200 HB	First choice	AH3135	ML	100 - 300	0.2 - 0.5
		- 200 HB	For wear resistance	AH725	ML	100 - 300	0.2 - 0.5
		- 200 HB	For fracture resistance	AH140	MJ	80 - 180	0.2 - 0.5
	High carbon steel C45E, C55E, etc.	200 - 300 HB	First choice	AH3135	MJ	100 - 230	0.2 - 0.4
		200 - 300 HB	For wear resistance	AH725	MJ	100 - 230	0.2 - 0.4
		200 - 300 HB	For fracture resistance	AH140	MJ	80 - 180	0.2 - 0.4
	Alloy steel 42CrMo4, 17Cr3, etc.	150 - 330 HB	First choice	AH3135	MJ	100 - 200	0.2 - 0.4
		150 - 330 HB	For wear resistance	AH725	MJ	100 - 200	0.2 - 0.4
		150 - 330 HB	For fracture resistance	AH140	MJ	80 - 150	0.2 - 0.4
M	Stainless steel X5CrNi18-9, etc.	- 200 HB	First choice	AH3135	ML	100 - 150	0.1 - 0.3
K	Grey cast iron GG35, GG45, etc.	150 - 250 HB	First choice	AH120	ML	100 - 250	0.1 - 0.5
		150 - 250 HB	For fracture resistance	AH725	MJ	100 - 250	0.1 - 0.5
		150 - 250 HB	For wear resistance	T1215	MJ	150 - 300	0.1 - 0.5
	Ductile cast iron GGG60, etc.	150 - 300HB	First choice	AH120	ML	80 - 200	0.1 - 0.4
		150 - 300 HB	For fracture resistance	AH725	MJ	80 - 200	0.1 - 0.4
		150 - 300 HB	For wear resistance	T1215	MJ	100 - 250	0.1 - 0.4
H	Hardened steel	HRC 40 - 50	First choice	AH3135	MJ	80 - 130	0.1 - 0.2
		HRC 50 - 60	First choice	AH3135	MJ	50 - 70	0.05 - 0.1

Single-sided inserts

ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t)	
						ML	HJ*
P	Low carbon steel C15E, etc.	- 200	First choice	AH3135	100 - 300	0.1 - 0.5	0.5 - 2.0
		- 200	For fracture resistance	AH130	100 - 300	0.1 - 0.5	-
	High carbon steel C45E, C55E, etc.	200 - 300 HB	First choice	AH3135	100 - 230	0.1 - 0.4	0.5 - 1.5
		200 - 300 HB	For fracture resistance	AH130	100 - 230	0.1 - 0.4	-
	Alloy steel 42CrMo4, 17Cr3, etc.	150 - 330 HB	First choice	AH3135	100 - 200	0.1 - 0.4	0.5 - 1.5
		150 - 330 HB	For fracture resistance	AH130	100 - 200	0.1 - 0.4	-
M	Stainless steel X5CrNi18-9, etc.	- 200 HB	First choice	AH3135	100 - 150	0.1 - 0.3	0.3 - 0.7
		- 200 HB	For fracture resistance	AH130	100 - 150	0.1 - 0.3	-
K	Grey cast iron GG35, GG45, etc.	150 - 250 HB	First choice	AH3135	100 - 250	0.1 - 0.5	0.5 - 2.0
		150 - 250 HB	For fracture resistance	AH130	100 - 250	0.1 - 0.5	-
	Ductile cast iron GGG60, etc.	150 - 250 HB	First choice	AH3135	80 - 200	0.1 - 0.4	0.5 - 1.5
		150 - 250 HB	For fracture resistance	AH130	80 - 200	0.1 - 0.4	-
S	Titanium alloy Ti-6Al-4V, etc.	- HRC 40	First choice	AH3135	30 - 60	0.1 - 0.3	0.3 - 0.7
		- HRC 40	For fracture resistance	AH130	30 - 60	0.1 - 0.3	-
	Heat resistant alloy Inconel718, etc.	- HRC 40	First choice	AH3135	10 - 40	0.05 - 0.15	0.1 - 0.3
		- HRC 40	For fracture resistance	AH130	10 - 40	0.05 - 0.15	-
H	Hardened steel	HRC 40 - 50	First choice	AH3135	80 - 130	-	0.1 - 0.3
		HRC 50 - 60	First choice	AH3135	50 - 70	-	0.03 - 0.07

* Apply 20% of recommended feed when using HJ insert with *ap* over 1.5 mm.

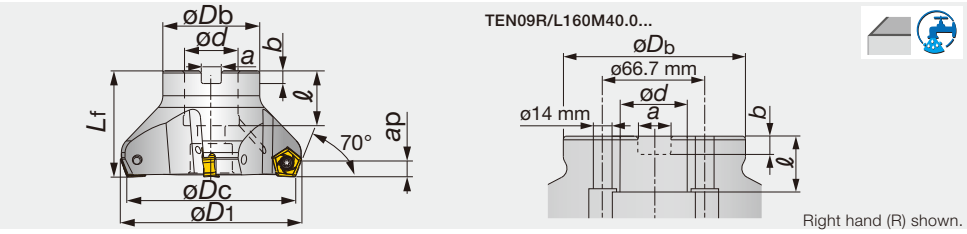
MEMO

DOPENT

TEN09R/L

70° face mills with double sided pentagonal inserts.

A.R.=-6°,R.R.=-10°~-2°



Designation	Max. ap	øDc	z	øD1	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TEN09R050M22.0E04	6.4	50	4	56	41	40	22	20	10.4	6.3	0.3	with	PN*U0905...
TEN09R050M22.0E06	6.4	50	6	56	41	40	22	20	10.4	6.3	0.3	with	PN*U0905...
TEN09R063M22.0E06	6.4	63	6	69	41	40	22	20	10.4	6.3	0.5	with	PN*U0905...
TEN09R063M22.0E08	6.4	63	8	69	41	40	22	20	10.4	6.3	0.5	with	PN*U0905...
TEN09R080M27.0E07	6.4	80	7	86	50	50	27	22	12.4	7	0.9	with	PN*U0905...
TEN09R080M27.0E10	6.4	80	10	86	50	50	27	22	12.4	7	1	with	PN*U0905...
TEN09R/L100M32.0E08*	6.4	100	8	106	60	50	32	28.5	14.4	8	1.3	with	PN*U0905...
TEN09R100M32.0E12	6.4	100	12	106	60	50	32	28.5	14.4	8	1.4	with	PN*U0905...
TEN09R/L125M40.0E10*	6.4	125	10	131	71	63	40	32	16.4	9	2.3	with	PN*U0905...
TEN09R125M40.0E16	6.4	125	16	131	71	63	40	32	16.4	9	2.5	with	PN*U0905...
TEN09R/L160M40.0E12*	6.4	160	12	166	100	63	40	29	16.4	9	4	without	PN*U0905...
TEN09R160M40.0E20	6.4	160	20	166	100	63	40	29	16.4	9	4.3	without	PN*U0905...

* For TEN09L (left-hand cutter), use the neutral-hand inserts.

SPARE PARTS

Designation	Clamping screw	Grip	Lubricant	Center bolt	Center bolt 1	Torx bit
TEN09R050 - 063...	CSTR-4L100	H-TBS	M-1000	-	CM10X30H	BT15S
TEN09R080...	CSTR-4L100	H-TBS	M-1000	-	CM12X30H	BT15S
TEN09R/L100...	CSTR-4L100	H-TBS	M-1000	TMBA-M16H	-	BT15S
TEN09R/L125M...10	CSTR-4L100	H-TBS	M-1000	TMBA-M20H	-	BT15M
TEN09R125M...16	CSTR-4L100	H-TBS	M-1000	TMBA-M20H	-	BT15S
TEN09R/L160M...12	CSTR-4L100	H-TBS	M-1000	-	-	BT15M
TEN09R160M...20	CSTR-4L100	H-TBS	M-1000	-	-	BT15S

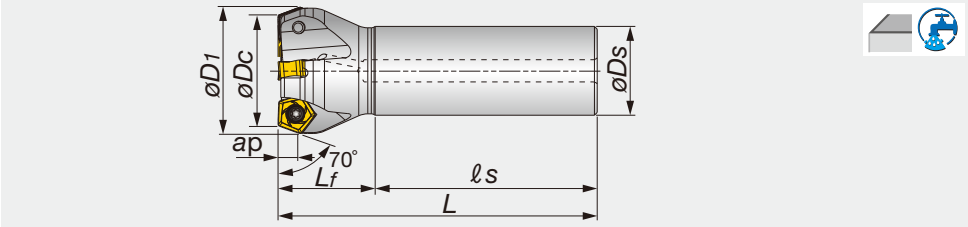
Reference pages

Inserts → **D128**, Standard cutting conditions → **D129**

EEN09

70° endmills with double sided pentagonal inserts.

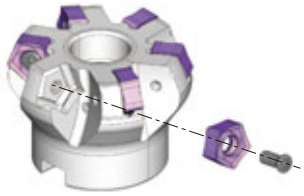
A.R.=-6°,R.R.=-2°~-10°



Designation	Max. ap	øDc	z	øD1	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EEN09R032M32.0-03	6.4	32	3	38	32	80	35	115	0.7	with	PN*U0905...
EEN09R040M32.0-04	6.4	40	4	46	32	80	35	115	0.7	with	PN*U0905...
EEN09R050M32.0-04	6.4	50	4	56	32	80	40	120	0.9	with	PN*U0905...
EEN09R063M32.0-06	6.4	63	6	69	32	80	40	120	1	with	PN*U0905...
EEN09R080M32.0-07	6.4	80	7	86	32	80	40	120	1.3	with	PN*U0905...

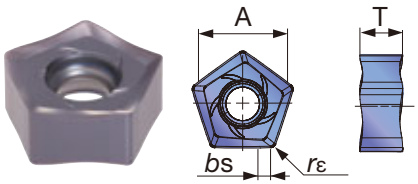
SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EEN09	CSTR-4L100	M-1000	T-15D

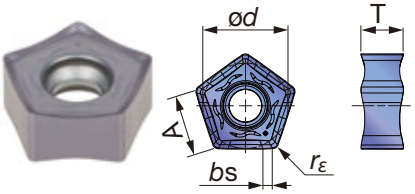


INSERT

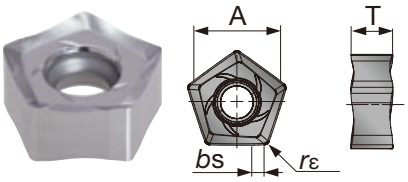
PNCU0905-MJ (Right-hand)



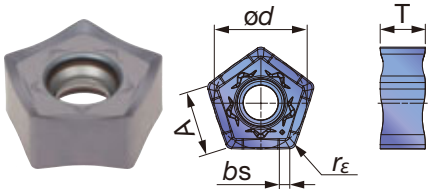
PNCU0905-ML (Neutral-hand)



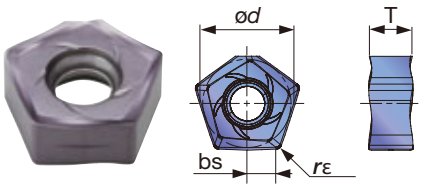
PNCU0905-AJ (Right-hand)



PNMU0905-MJ (Neutral-hand)



PNCU0905-W (Right-hand)



P	Steel	☆		★	★			☆		★			
M	Stainless		☆	☆	★								
K	Cast iron	★		☆		★	★						
N	Non-ferrous										★		
S	Superalloys	☆		★	☆								
H	Hard materials												

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated							Cermet	Un-coated					A	T	ød	bs
			AH120	AH140	AH725	AH3135	T1115	T1215	T3130	NS740	TH10								
PNCU0905GNER-MJ	0.8	6.4	●	●	●		●		●	●						8.9	5.93	12.2	1.4
PNCU0905GNEN-ML	0.8	6.4				●										8.9	5.96	12.2	1.4
PNCU0905GNFR-AJ	0.8	6.4									●					8.9	6.25	12.2	1.4
PNMU0905GNEN-MJ	0.8	6.4	●			●		●								8.9	6	12.2	1.4
PNCU0905GNER-W	0.8	2			●											-	5.93	12.2	3.8

●: Line up

Reference pages

Standard cutting conditions → **D129**

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness HB	Selection criteria	Recommended grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steel C15, etc.	- 200	First choice	AH3135, AH725	MJ	100 - 250	0.1 - 0.6
		- 200	Low cutting force	AH3135	ML	100 - 250	0.1- 0.5
		- 200	Priority on wear resistance	T3130	MJ	120 - 250	0.1 - 0.6
		- 200	Priority on surface quality	NS740	MJ	100 - 250	0.1 - 0.5
	High carbon steel C45, etc.	200 - 300	First choice	AH3135, AH725	MJ	100 - 230	0.1 - 0.5
		200 - 300	Low cutting force	AH3135	ML	100 - 230	0.1- 0.4
		200 - 300	Priority on wear resistance	T3130	MJ	120 - 250	0.1 - 0.5
		200 - 300	Priority on surface quality	NS740	MJ	100 - 250	0.1 - 0.4
	Alloyed steel 42CrMo4, etc.	150 - 300	First choice	AH3135, AH725	MJ	100 - 230	0.1 - 0.5
		150 - 300	Low cutting force	AH3135	ML	100 - 230	0.1- 0.4
		150 - 300	Priority on wear resistance	T3130	MJ	120 - 250	0.1 - 0.5
		150 - 300	Priority on fracture resistance	NS740	MJ	100 - 250	0.1 - 0.4
	Tool steel X153CrMoV12, etc.	- 300	First choice	AH3135, AH725	MJ	100 - 180	0.1 - 0.5
		- 300	Low cutting force	AH3135	ML	100 - 180	0.1- 0.4
		- 300	Priority on wear resistance	T3130	MJ	120 - 180	0.1 - 0.5
M	Stainless steel X5CrNi18-9, etc.	-	First choice	AH3135	ML	90 - 180	0.1 - 0.4
		-	Priority on fracture resistance	AH3135, AH140	MJ	90 - 180	0.1 - 0.45
K	Grey cast irons 250, etc.	-	First choice	AH120	MJ	140 - 250	0.1 - 0.6
		-	Priority on wear resistance	T1215	MJ	150 - 280	0.1 - 0.6
	Ductile cast iron 400-15S, etc.	-	First choice	AH120	MJ	100 - 200	0.1 - 0.6
		-	Priority on wear resistance	T1215	MJ	120 - 220	0.1 - 0.6
N	Aluminium alloys Si < 13%	-	First choice	TH10	AJ	500 - 1500	0.1 - 0.5
	Aluminium alloys Si ≥ 13%	-	First choice	TH10	AJ	150 - 500	0.1 - 0.5
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH3135	ML	30 - 60	0.1 - 0.4
		-	Priority on fracture resistance	AH3135	MJ	30 - 60	0.1 - 0.4
	Heat-resistance alloys Inconel 718, etc.	-	First choice	AH725	MJ	20 - 50	0.04 - 0.1

· Remove excessive chip with an air blast to prevent chip jamming.
· Use water-soluble coolant to avoid built-up edge in case extreme welding occurs on cutting edges. (ex. aluminium machining).
· For the operation with depth of cut which varies (ex. casting skin) and machining of workpiece materials with interrupted surface, the feed (*fz*) should be set to the lower recommended value shown in the above table.
· Cutting conditions may be limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth or overhang length is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

Installation of the extra close pitch cutter inserts

- The extra close pitch cutter has a slanted screw.
- Locate insert and then fasten the screw. (Fig. A)
- Appropriate torque is 3.5 N·m.
- After fastening the screw, please ensure there is no space between the cutter body and insert. (Fig. B)

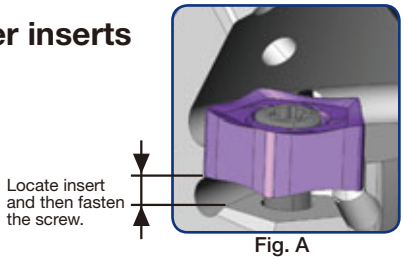


Fig. A

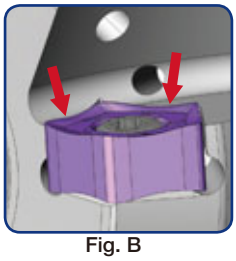


Fig. B

NOTES ON USE OF WIPER INSERT

- To achieve a good surface finish, a wiper insert is recommended. (PNCU0905GNER-W)
- When using the wiper insert, install the insert as shown in Fig. C. Ensure that the groove is at the front as shown in Fig. D.
- The wiper insert has two wiping corners. (Fig. D)
- Do not use the other corners. It may break the tool body.

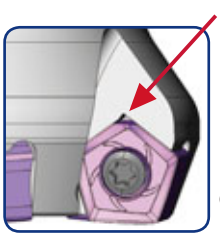


Fig. C

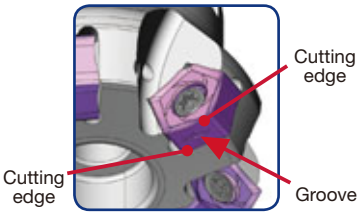
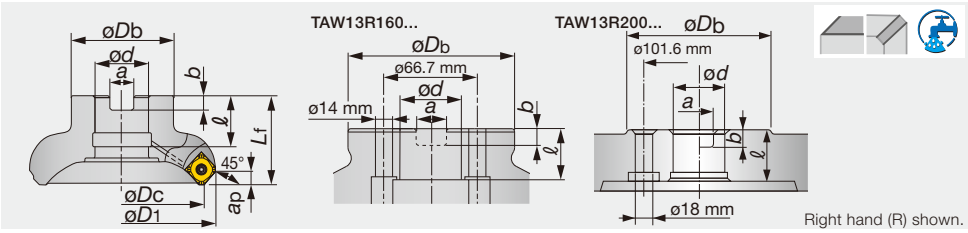


Fig. D

TAW13

30°~ 45° face mills with screw clamped SWMT/SWGT13 inserts

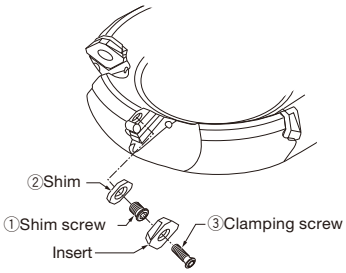
A.R.=+17°~+20°,R.R.=-16°~-11°



Designation	øDc	z	øD1	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TAW13R050M22.0E04	50	4	63	41	40	22	20	10.4	6.3	0.4	with	SW*T13...
TAW13R050M22.0E05	50	5	63	41	40	22	20	10.4	6.3	0.4	with	SW*T13...
TAW13R063M22.0E05	63	5	76	41	40	22	20	10.4	6.3	0.6	with	SW*T13...
TAW13R063M22.0E06	63	6	76	41	40	22	20	10.4	6.3	0.6	with	SW*T13...
TAW13R080M27.0E06	80	6	94	50	50	27	22	12.4	7	1	with	SW*T13...
TAW13R080M27.0E08	80	8	94	50	50	27	22	12.4	7	1	with	SW*T13...
TAW13R100M32.0E07	100	7	114	60	50	32	28.5	14.4	8	1.5	with	SW*T13...
TAW13R100M32.0E10	100	10	114	60	50	32	28.5	14.4	8	1.5	with	SW*T13...
TAW13R125M40.0E08	125	8	139	80	63	40	32	16.4	9	2.7	with	SW*T13...
TAW13R125M40.0E12	125	12	139	80	63	40	32	16.4	9	3	with	SW*T13...
TAW13R160M40.0E10	160	10	174	100	63	40	29	16.4	9	4.4	without	SW*T13...
TAW13R160M40.0E16	160	16	174	100	63	40	29	16.4	9	4.4	without	SW*T13...

SPARE PARTS

Designation	③Clamping screw	Lubricant	①Shim screw	Center bolt	Center bolt 1	②Shim	Wrench	Wrench 1
TAW13R050 - 063...	CSPB-3.5	M-1000	DTS5-3.5SS	-	CM10X30H	FSSA1102	IP-15D	P-3.5
TAW13R080...	CSPB-3.5	M-1000	DTS5-3.5SS	-	CM12X30H	FSSA1102	IP-15D	P-3.5
TAW13R100...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-M16H	-	FSSA1102	IP-15D	P-3.5
TAW13R125...	CSPB-3.5	M-1000	DTS5-3.5SS	TMBA-M20H	-	FSSA1102	IP-15D	P-3.5
TAW13R160...	CSPB-3.5	M-1000	DTS5-3.5SS	-	-	FSSA1102	IP-15D	P-3.5



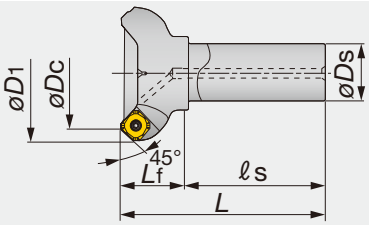
Reference pages

Inserts → **D133**, Standard cutting conditions → **D134 - D135**

EAW13

30°~ 45° endmills with screw clamped SWMT/SWGT13 inserts

A.R.=+17°~+20°,R.R.=-16°~-11°

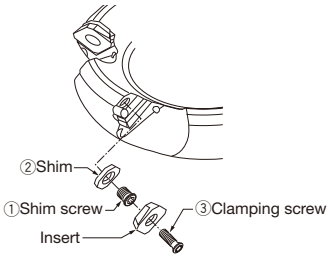


Right hand (R) shown.

Designation	øDc	z	øD1	øDs	ℓs	Lf	L	Kg	Air hole	Insert
EAW13R025M25.0-02	25	2	39	25	80	35	115	0.4	with	SW*T13/WWCW13...
EAW13R032M32.0-02	32	2	46	32	80	35	115	0.7	with	SW*T13/WWCW13...
EAW13R040M32.0-03	40	3	54	32	80	35	115	0.8	with	SW*T13/WWCW13...
EAW13R050M32.0-03	50	3	63	32	80	40	120	1	with	SW*T13/WWCW13...
EAW13R050M32.0-04	50	4	63	32	80	40	120	0.9	with	SW*T13/WWCW13...
EAW13R063M32.0-04	63	4	76	32	80	40	120	1.1	with	SW*T13/WWCW13...
EAW13R063M32.0-05	63	5	76	32	80	40	120	1.1	with	SW*T13/WWCW13...
EAW13R080M32.0-04	80	4	94	32	80	40	120	1.5	with	SW*T13/WWCW13...
EAW13R080M32.0-06	80	6	94	32	80	40	120	1.4	with	SW*T13/WWCW13...

SPARE PARTS

Designation	③Clamping screw	Lubricant	①Shim screw	②Shim	Wrench	Wrench 1
EAW13R025**~040**	CSPB-3.5	M-1000	-	-	IP-15D	-
EAW13R050**~080**	CSPB-3.5	M-1000	DTS5-3.5SS	FSSA1102	IP-15D	P-3.5

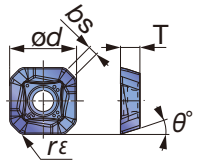


Reference pages

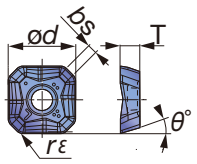
Inserts → **D133**, Standard cutting conditions → **D134 - D135**

INSERT

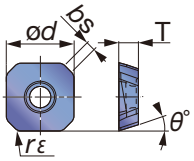
SWMT13T3-MJ



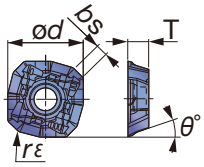
SWMT13T3-ML



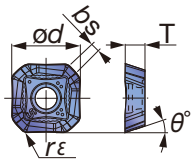
SWMW13T3 (Flat)



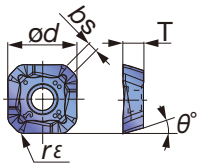
SWMT13T3-HJ



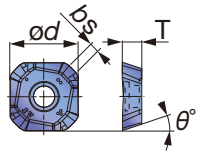
SWMT13T3-MS



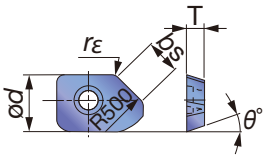
SWGT13T3-MJ



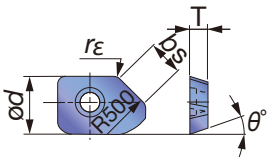
SWGT13T3-AJ



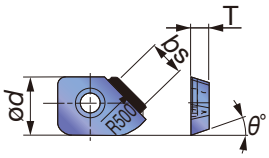
WWCW13T3AFER-WS



WWCW13T3AFFR-WS



WWCW13T3AFFR-WD



P	Steel	☆			★				★				★			
M	Stainless		★	☆	★											
K	Cast iron	★				★	★	★								
N	Non-ferrous									★				★		★
S	Superalloys	★	☆		☆											
H	Hard materials															

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated										Cermet		Un-coated		PCD		ød	T	θ°	bs
			AH120	AH130	AH140	AH3135	GH110	T1115	T1215	T3130	DS1100		NS740		KS05F		DX140					
SWMT13T3AFPR-MJ	1.5	4	●	●	●	●		●	●	●			●						13.9	4	18.5	2
SWMT13T3AFER-ML	1.5	2.5	●																13.9	4	18.5	2
SWMW13T3AFTR	1.5	5	●					●	●	●			●						13.9	4	18.5	2
SWMT13T3AFPR-HJ	1.5	2	●	●	●			●	●	●									14.7	4	18.5	2.3
SWMT13T3AFPR-MS	1	4		●	●	●													14.1	4	18.5	2
SWGT13T3AFPR-MJ	1.5	4	●										●						13.9	4	18.5	2
SWGT13T3AFFR-AJ	-	4									●				●				14.1	4	18.5	2
WWCW13T3AFER-WS	1.5	-					●						●						12.8	4	18.5	7.8
WWCW13T3AFFR-WS	1.5	-									●				●				12.8	4	18.5	7.8
WWCW13T3AFFR-WD	-	-															●		12.8	4	18.5	7.8

●: Line up
DX140 : Packing Quantity = 1 pc.

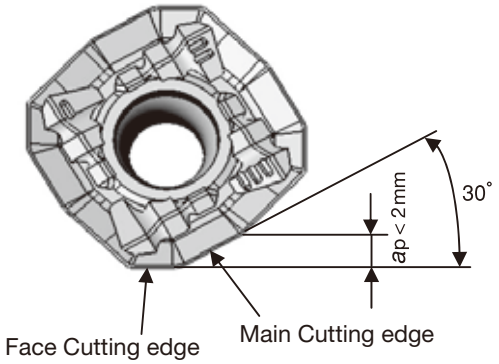
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Priority	Grade	Cutting speed *vc* (m/min)	Roughing (Depth of cut: > 1.0 mm) Feed per tooth: *fz* (mm/t) MJ	ML	HJ	MS	Flat	AJ
P	Mild and low carbon steels E275A, etc. < 180 HB	First choice	AH3135 AH120	100 - 270	0.05 - 0.3	0.05 - 0.25	0.2 - 0.6	0.1 - 0.25	0.05 - 0.3	-
		Priority on wear resistance	T3130	150 - 300	0.05 - 0.3	-	0.2 - 0.6	-	0.05 - 0.3	-
		Priority on surface quality	NS740	100 - 300	0.05 - 0.23	-	-	-	0.05 - 0.23	-
	Carbon and alloy steels C45, 42CrMo4, etc. < 300 HB	First choice	AH3135 AH120	100 - 230	0.05 - 0.25	0.05 - 0.2	0.2 - 0.5	-	0.05 - 0.25	-
		Priority on wear resistance	T3130	150 - 280	0.05 - 0.25	-	0.2 - 0.5	-	0.05 - 0.25	-
		Priority on surface quality	NS740	100 - 230	0.05 - 0.2	-	-	-	0.05 - 0.2	-
	Die steels X96CrMoV12, etc. < 30 HRC	First choice	AH3135 AH120	100 - 180	0.05 - 0.2	0.05 - 0.2	0.2 - 0.4	-	0.05 - 0.2	-
		Priority on wear resistance	T3130	100 - 180	0.05 - 0.2	-	0.2 - 0.4	-	0.05 - 0.2	-
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc. < 250 HB	First choice	AH3135 AH130	80 - 200	0.1 - 0.25	-	0.2 - 0.5	0.1 - 0.2	-	-
		Priority on wear resistance	AH120	150 - 250	0.1 - 0.25	0.1 - 0.2	0.2 - 0.5	-	0.1 - 0.25	-
K	Grey cast irons 250, 300, etc.	First choice	T1215	180 - 300	0.05 - 0.25	-	0.2 - 0.6	-	0.05 - 0.25	-
		Priority on impact resistance	AH120	150 - 250	0.05 - 0.25	0.05 - 0.2	0.2 - 0.6	-	0.05 - 0.25	-
	Ductile cast irons 400-15S, 600-3, etc.	First choice	T1215	120 - 200	0.05 - 0.25	-	0.2 - 0.6	-	0.05 - 0.25	-
		Priority on impact resistance	AH120	100 - 180	0.05 - 0.25	0.05 - 0.2	0.2 - 0.6	-	0.05 - 0.25	-
S	Titanium alloys Ti-6Al-4V, etc.	First choice	AH130	30 - 60	-	-	-	0.1 - 0.2	-	-
	Heat-resistance alloys Inconel 718, etc.	First choice	AH120	10 - 40	0.05 - 0.15	-	-	-	-	-
N	Aluminium alloys Si < 13 %	-	DS1100 KS05F	300 - 1000	-	-	-	-	-	0.05 - 0.2
	Aluminium alloys Si ≥ 13%	-	DS1100 KS05F	80 - 300	-	-	-	-	-	0.05 - 0.2
	Copper alloys	-	DS1100 KS05F	200 - 500	-	-	-	-	-	0.05 - 0.2

Notes for use of HJ-type inserts

HJ-type inserts can be used for high feed machining.
When using the insert, care should be taken with the following:

- The maximum depth of cut is *ap* = 2 mm. Select feeds within the above value.
- Do not use the HJ-type inserts with other types (such as MJ- and MS-types) in the same body.
- The outer shape of the HJ-type insert is different from those of other types (such as MJ- and MS-types), but the insert can be held in the same insert pocket.



Notes on use of wiper insert

- When requiring good surface finishes, use of a wiper insert (WWCW13T3AF_ R-W_) is recommended. In general, installing one wiper insert delivers superior surface finishes.
- When using the wiper insert, install the insert as shown in Fig. A. If the insert is installed as shown in Fig. B, breakage of the insert is inevitable and normal surface finish can not be obtained.
- The wiper insert must not be used together with HJ-type inserts
- The wiper insert has one wiping corner.
- The peripheral cutting edge of the wiper insert is retracted from the edge of the normal inserts. Therefore, the feed per tooth (*fz* mm/t) of the normal insert following the wiper insert is double that of other inserts.
- When using the wiper insert, depth of cut (*ap*) less than 1 mm is recommended.

Fig. A

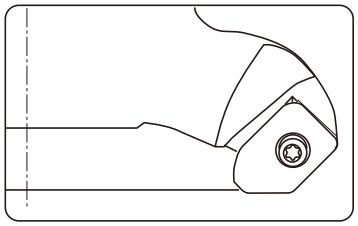
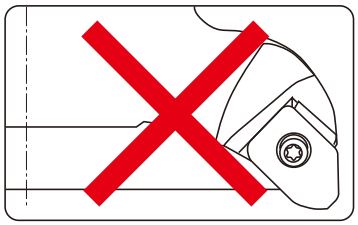


Fig. B

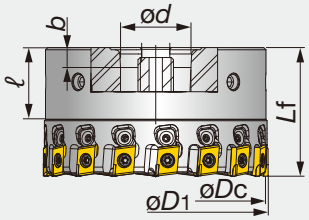


ISO	Workpiece material	Priority	Grade	Cutting speed *vc* (m/min)	Light cutting to finishing (Depth of cut: ≤ 1.0 mm) Feed per tooth: *fz* (mm/t)					
					MJ	ML	HJ	MS	Flat	AJ
P	Mild and low carbon steels E275A, etc. < 180 HB	First choice	AH3135 AH120	100 - 270	0.05 - 0.25	0.05 - 0.2	0.2 - 0.6	0.1 - 0.2	0.05 - 0.25	-
		Priority on wear resistance	T3130	150 - 300	0.05 - 0.25	-	0.2 - 0.6	-	0.05 - 0.25	-
		Priority on surface quality	NS740	100 - 300	0.05 - 0.2	-	-	-	0.05 - 0.2	-
	Carbon and alloy steels C45, 42CrMo4, etc. < 300 HB	First choice	AH3135 AH120	100 - 230	0.05 - 0.2	0.05 - 0.15	0.2 - 0.5	-	0.05 - 0.2	-
		Priority on wear resistance	T3130	150 - 280	0.05 - 0.2	-	0.2 - 0.5	-	0.05 - 0.2	-
		Priority on surface quality	NS740	100 - 230	0.05 - 0.18	-	-	-	0.05 - 0.18	-
	Die steels X96CrMoV12, etc. < 30 HRC	First choice	AH3135 AH120	100 - 180	0.05 - 0.18	0.05 - 0.12	0.2 - 0.4	-	0.05 - 0.18	-
		Priority on wear resistance	T3130	100 - 180	0.05 - 0.18	-	0.2 - 0.4	-	0.05 - 0.18	-
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc. < 250 HB	First choice	AH3135 AH130	80 - 200	0.1 - 0.2	-	0.2 - 0.5	0.1 - 0.18	-	-
		Priority on wear resistance	AH120	150 - 250	0.1 - 0.2	0.1 - 0.18	0.2 - 0.5	-	0.1 - 0.2	-
K	Grey cast irons 250, 300, etc.	First choice	T1215	180 - 300	0.1 - 0.2	-	0.2 - 0.6	-	0.1 - 0.2	-
		Priority on impact resistance	AH120	150 - 250	0.1 - 0.2	0.05 - 0.18	0.2 - 0.6	-	0.1 - 0.2	-
	Ductile cast irons 400-15S, 600-3, etc.	First choice	T1215	120 - 200	0.1 - 0.2	-	0.2 - 0.6	-	0.1 - 0.2	-
		Priority on impact resistance	AH120	100 - 180	0.1 - 0.2	0.05 - 0.18	0.2 - 0.6	-	0.1 - 0.2	-
S	Titanium alloys Ti-6Al-4V, etc.	First choice	AH130	30 - 60	-	-	-	0.1 - 0.2	-	-
	Heat-resistance alloys Inconel 718, etc.	First choice	AH120	10 - 40	0.05 - 0.15	-	-	-	-	-
N	Aluminium alloys Si < 13 %	-	DS1100 KS05F	300 - 1000	-	-	-	-	-	0.05 - 0.2
	Aluminium alloys Si ≥ 13%	-	DS1100 KS05F	80 - 300	-	-	-	-	-	0.05 - 0.2
	Copper alloys	-	DS1100 KS05F	200 - 500	-	-	-	-	-	0.05 - 0.2

Notes:
- When cutting at a large depth of cut or a large cutting width, the cutting speed (*vc*) and feed (*fz*) should be set to the lower side of the values shown in the above table.
- Dry cutting (or air-blowing) is generally recommended. However, when chips tend to excessively adhere to the cutting edges when machining stainless steel, use a water soluble cutting fluid. In this case, use the AH130 grade at speeds lower than *vc* = 100 m/min.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.
- TAW13 type TAC mills cannot be used for axial-feed cutting such as ramping, plunging and drilling.

TPYP12

High speed milling cutter with PCD insert for non ferrous materials



Designation	øDc	øD1	z	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TPYP12M050B22.0R08	50	51.4	8	55	22	20	10.4	6.3	0.9	with	YPEB12X3-*P...
TPYP12M063B22.0R10	63	64.4	10	55	22	20	10.4	6.3	1.3	with	YPEB12X3-*A...
TPYP12M080B27.0R12	80	81.4	12	58	27	22	12.4	7	2.2	with	YPEB12X3-*A...
TPYP12M100B32.0R16	100	101.4	16	58	32	25	14.4	8	1.9	with	YPEB12X3-*A...
TPYP12M125B40.0R20	125	126.4	20	58	40	28	16.4	9	2.9	with	YPEB12X3-*A...

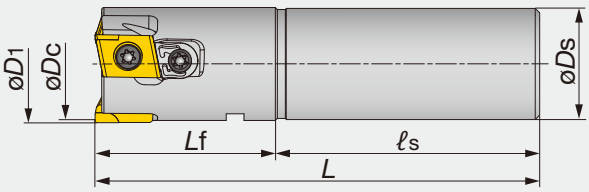
*D1: Outside diameter
Dc: diameter with 01 type insert

SPARE PARTS

Designation	Clamping screw	Wrench	Locator fixing screw	Locator	Wrench	Cover	Center bolt
TPYP12M050B22.0R08	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	-	RSFTS-050M
TPYP12M063B22.0R10	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6063M	VC004762I10035F
TPYP12M080B27.0R12	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6080	VC00TEDI12040F
TPYP12M100B32.0R16	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6100	VC00TANG16040F
TPYP12M125B40.0R20	VX040024A	T-15F	RSRGR5M40	RSFTC1008	T-8F	RSFTS6125	VC00TEDI20040F

EPYP12

High speed milling endmill with PCD insert for non ferrous materials



Designation	øDc	øD1	z	øDs	L	Lf	ℓs	Kg	Air hole	Insert
EPYP12M025C25.0R03	25	26.4	3	25	100	50	50	0.4	with	YPEB12X3-*P...
EPYP12M032C25.0R05	32	33.4	5	25	100	45	55	0.5	with	YPEB12X3-*P...

*D1: Outside diameter
Dc: diameter with 01 type insert

SPARE PARTS

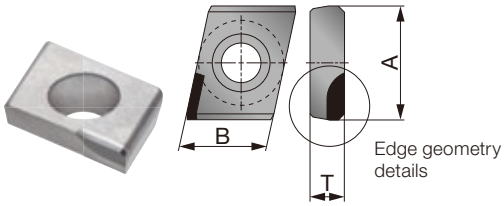
Designation	Clamping screw	Wrench	Locator fixing screw	Locator	Wrench
EPYP12M025C25.0R03	VX040024A	T-15F	VX040028A	RSFTC1011	T-8F
EPYP12M032C25.0R05	VX040024A	T-15F	RSRGR5M40	RSFTC1009	T-8F

Reference pages

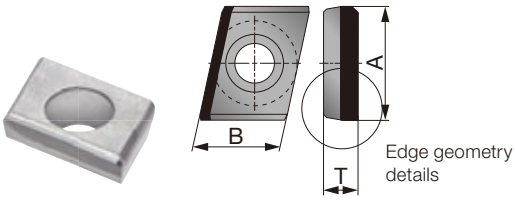
Inserts, Standard cutting conditions → **D137**

INSERT

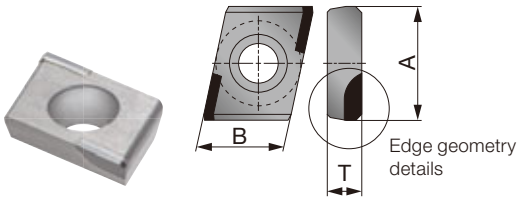
YPEB12X3-1A/P



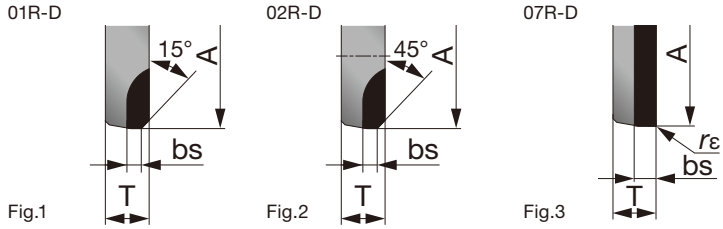
YPEB12X-FP



YPEB12X3-2A/P



Edge geometry details



P	Steel	
M	Stainless	
K	Cast iron	
N	Non-ferrous	★
S	Superalloys	
H	Hard materials	

★ : First choice
☆ : Second choice

Designation	No. of corner	rε	Max. ap	PCD DX160	A	B	T	bs	Applicable cutter diameters	Fig.
YPEB12X3-1A01R-D	1	-	4	●	12.77	9.525	3.85	1.59	Dc>ϕ50mm	1
YPEB12X3-1A02R-D	1	-	4	●	12.756	9.525	3.85	1.29	Dc>ϕ50mm	2
YPEB12X3-1A07R-D	1	0.4	4	●	12.756	9.525	3.85	1.34	Dc>ϕ50mm	3
YPEB12X3-1P02R-D	1	-	4	●	12.817	9.525	3.85	1.37	Dc≤ϕ50mm	2
YPEB12X3-1P07R-D	1	0.4	4	●	12.817	9.525	3.85	1.37	Dc≤ϕ50mm	3
YPEB12X3-FP02R-D	1	-	11	●	12.817	9.525	3.85	1.37	Dc≤ϕ50mm	2
YPEB12X3-FP07R-D	1	0.4	11	●	12.817	9.525	3.85	1.37	Dc≤ϕ50mm	3
YPEB12X3-2A01R-D	2	-	4	●	12.8	9.525	3.868	1.59	Dc>ϕ50mm	1
YPEB12X3-2A02R-D	2	-	4	●	12.8	9.525	3.868	2.07	Dc>ϕ50mm	2
YPEB12X3-2A07R-D	2	0.4	4	●	12.8	9.525	3.868	2.07	Dc>ϕ50mm	3
YPEB12X3-2P07R-D	2	0.4	4	●	12.876	9.525	3.85	2.07	Dc≤ϕ50mm	3

●: Line up

Package quantity : 2pcs.

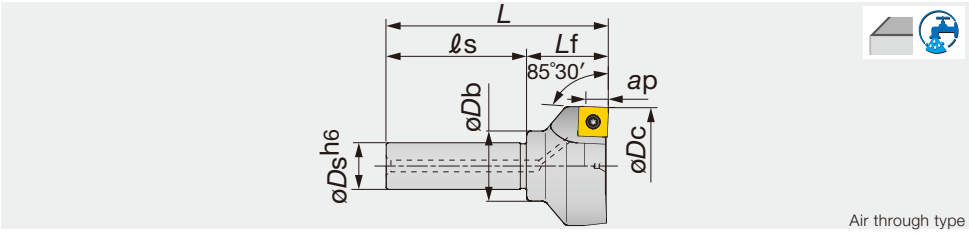
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting Speed Vc (m/min)	Feed per tooth fz (mm/z)
N	Aluminum cast Si<13%	DX160	≤6000	0.05 - 0.25
	Aluminum cast Si≥13%	DX160	≤1500	0.05 - 0.25
	Copper, brass, etc	DX160	≤2000	0.05 - 0.25
	Non metalic material	DX160	≤3000	0.05 - 0.25

EFE12R

86° endmills with screw clamped inserts for aluminum machining

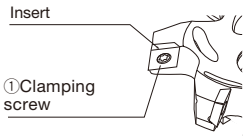
A.R. = +13°, R.R. = +7°



Designation	Max. ap	øDc	z	øDs	øDb	ℓs	Lf	L	Kg	Air hole	Insert
EFE12050R	8	50	3	20	30	60	35	95	0.37	with	SEG*12X4...

SPARE PARTS

Designation	① Clamping screw	Lubricant	Wrench
EFE12000R	CSPB-4S	M-1000	IP-15D



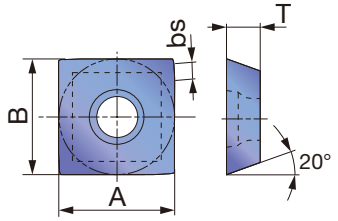
Face Milling

Reference pages

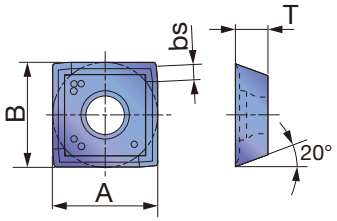
Inserts → **D139,** Standard cutting conditions → **D140**

INSERT

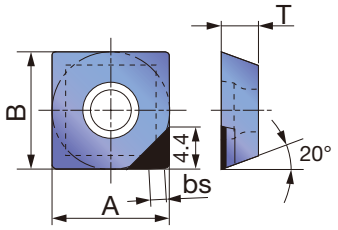
SEGW12X4ZEPR / ZEFR



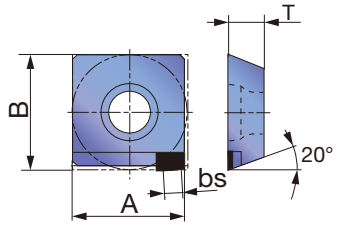
SEGT12X4-AJ



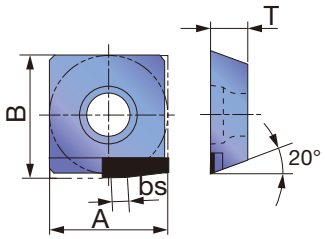
SEGW12X4ZEFR-D



SEGW12X4ZEFR-WD



SEGW12X4ZEFR-BD



		Coated			Cermet	Un-coated	PCD
P	Steel	★			★		
M	Stainless		★				
K	Cast iron	★					
N	Non-ferrous			★		★	★
S	Superalloys						
H	Hard materials						

★ : First choice
☆ : Second choice

Designation	Max. ap	AH120	AH140	DS1100	NS740	KS05F	DX140	A	B	T	bs
SEGW12X4ZEFR	8					●		12.7	12.7	4	1.8
SEGW12X4ZEPR	8	●	●		●			12.7	12.7	4	1.4
SEGT12X4ZEFR-AJ	8			●		●		12.7	12.7	4	1.8
SEGW12X4ZEFR-D	3.5						●	12.7	12.7	4	1.8
SEGW12X4ZEFR-WD	-						●	12.4	12.8	4	2
SEGW12X4ZEFR-BD	-						●	12.4	13.1	4	1.8

●: Line up

DX140 : Package quantity = 1pc.

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Designation	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels and alloy steels < 300HB	AH120	SEGW12X4ZEPR	100 ~ 180	0.03 ~ 0.15
		NS740	SEGW12X4ZEPR	100 ~ 180	0.03 ~ 0.15
M	Stainless steels < 250HB	AH140	SEGW12X4ZEPR	80 ~ 180	0.03 ~ 0.15
K	Grey and ductile cast irons	AH120	SEGW12X4ZEPR	100 ~ 200	0.03 ~ 0.15
N	Cast aluminium alloy / Die-cast Si < 13%	KS05F	SEGT12X4ZEFR-AJ	200 ~ 1500	0.05 ~ 0.2
		DX140	SEGW12X4ZEFR-D	200 ~ 1500	0.05 ~ 0.2
	Cast aluminium alloy / Die-cast Si ≥ 13%	KS05F	SEGT12X4ZEFR-AJ	80 ~ 200	0.05 ~ 0.2
		DX140	SEGW12X4ZEFR-D	200 ~ 500	0.05 ~ 0.2
	Aluminium alloy Tensile strength < 350 N/mm^2	KS05F	SEGT12X4ZEFR-AJ	200 ~ 1500	0.05 ~ 0.2
		DX140	SEGW12X4ZEFR-D	200 ~ 1500	0.05 ~ 0.2
	Aluminium alloy Tensile strength > 350 N/mm^2	KS05F	SEGW12X4ZEFR	200 ~ 1500	0.05 ~ 0.2
		DX140	SEGW12X4ZEFR-D	200 ~ 1500	0.05 ~ 0.2
	Copper alloy	KS05F	SEGT12X4ZEFR-AJ	200 ~ 500	0.05 ~ 0.2
		DX140	SEGW12X4ZEFR-D	200 ~ 500	0.05 ~ 0.2

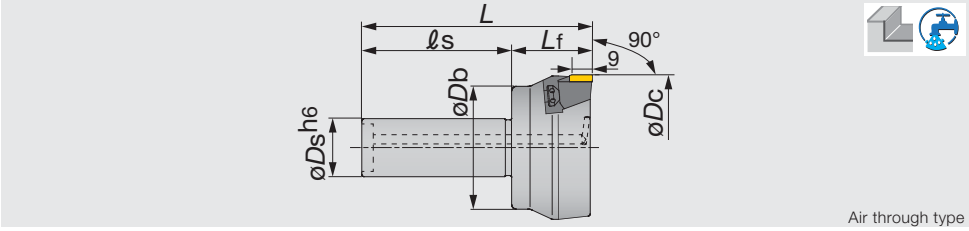
Notes:

- In milling aluminium and copper alloys:
  (1) For improved surface finish, use together with wiper insert SEGW12X4ZEFR-WD
  (2) For reducing burr occurrence, use together with deburring inserts SEGW12X4ZEFR-BD
- When milling aluminium and copper alloys, use of a water soluble cutting fluid is recommended. When milling steels, cast irons, and stainless steels, dry cutting is recommended.
- When the length-to-diameter overhang ratio of the tool (L/D) exceeds 3, reduce cutting speed and feed to 70 to 80% of the values given in the table.

EDPD09

Light weight square endmills with PCD inserts for alminum machining

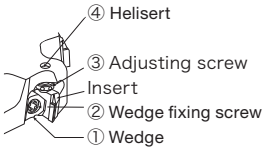
A.R. = +8.5°, R.R. = +3°



Designation	Max. ap	øDc	z	øDs	øDb	ℓs	Lf	L	Kg	Air hole	Insert
EDPD09063R	7	63	3	25	37	60	40	100	0.75	with	YDEN0905...

SPARE PARTS

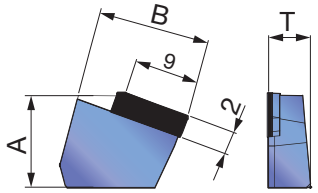
Designation	① Wedge	② Wedgte fixing screw	③ Adjusting screw	④ Helisert	Wrench	Wrench 1
EDPD09063R	FW-304R-T	FDS-8SST	AJM5	LM5-0.8X1DNS	T-27T	T-7F



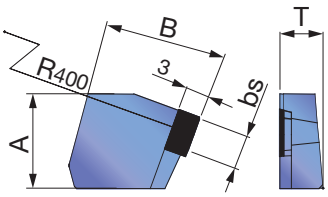
Face Milling

INSERT

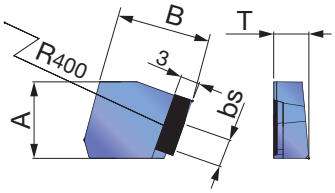
YDEN0905PDFR-D



YDEN0905PDFR-WD



YDEN0905PDFR-BD



P	Steel	
M	Stainless	
K	Cast iron	
N	Non-ferrous	★
S	Superalloys	
H	Hard materials	

★ : First choice
☆ : Second choice

Designation	Max. ap	PCD DX140	A	B	T	bs
YDEN0905PDFR-D	7	●	12.4	15.1	5.7	-
YDEN0905PDFR-WD	-	●	12.4	15.2	5.7	4.5
YDEN0905PDFR-BD	-	●	12.4	15.2	5.7	4.5

Note: As a principle, our company re-grinds these inserts.

●: Line up

Package quantity = 1pc.

Reference pages

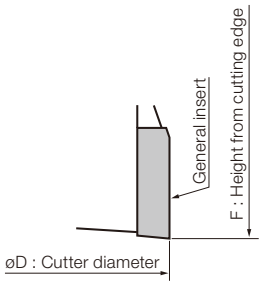
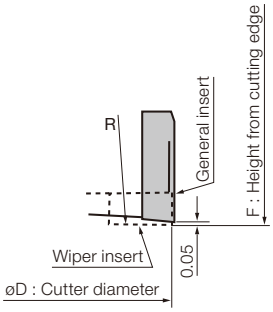
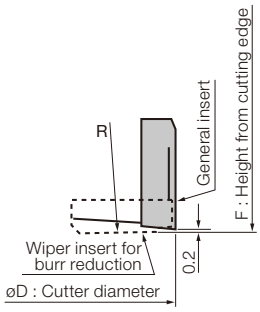
Standard cutting conditions → **D142**

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Designation	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
N	Aluminium alloy castings & die castings Si < 13%	DX140	YDEN0905PDFR-D	500 ~ 4000	0.05 ~ 0.2
	Aluminium alloy castings & die castings Si ≥ 13%	DX140	YDEN0905PDFR-D	200 ~ 500	0.05 ~ 0.2
	Rolled aluminium alloys	DX140	YDEN0905PDFR-D	500 ~ 4000	0.05 ~ 0.2
	Copper alloys	DX140	YDEN0905PDFR-D	200 ~ 500	0.05 ~ 0.2

Notes:
(1) When requiring improved surface finish, use the wiper insert together with regular inserts YDEN0905PDFR-WD.
(2) When requiring reduced burr occurrence, use the deburring inserts together with regular inserts YDEN0905PDFR-BD.
(3) When using the cutter at speeds over 1500m/min, use an arbor or tool-holder balanced to within G16.
(4) Wet cutting, using a water soluble cutting fluid, is recommended.
(5) When the length-to-diameter overhang ratio of the tool (L/D) exceeds 3, reduce cutting speed and feed to 70 to 80% of the values given in the table.

HOW TO PUT EACH INSERT TOGETHER

		For general	Accuracy of machining surface priority	Burr reduction priority
Applicable insert	General insert YDEN0905PDFR-D	◎	◎	◎
	Wiper insert YDEN0905PDFR-WD	–	◎	–
	Wiper insert for burr reduction YDEN0905PDFR-BD	–	–	◎
	Number of Inserts by type	All general	1 or 2 wiper inserts in cutter body	General insert : Burr wiper insert = 1 : 1
Specification of insert setting				
Accuracy of machining surface (roughness and undulation)		△	◎	○
Burr of machining surface		△	○	◎

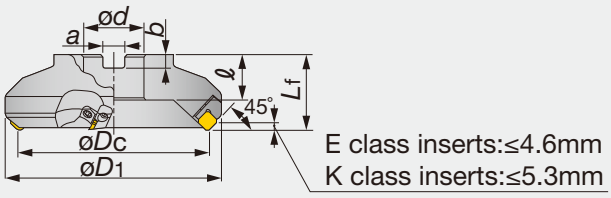
Face Milling

MEMO

TME4400RI

45˚ face mills with wedge clamped high-posi square inserts

A.R. = +24˚, R.R. = -8˚ ~ -6˚



Right hand (R) shown.

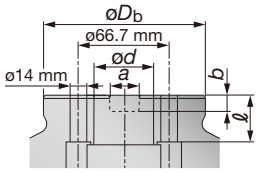
Designation	Max. ap	øDc	z	øD1	Lf	ød	ℓ	a	b	Kg	Insert
TME4403RI-E	4	80	4	101.5	50	27	26	12.4	7	1.43	SE*N1203
TME4404RI-E	4	100	5	120.2	63	32	32	14.4	8	2.74	SE*N1203
TME4405RI-E	4	125	6	145.2	63	40	32	16.4	9	4.04	SE*N1203
TME4406RI-E	4	160	8	181.2	63	40	29	16.4	9	5.82	SE*N1203

Note: Cutting edge height (*Lf*) is for when SEEN1203AG*N type inserts are used.

Face Milling

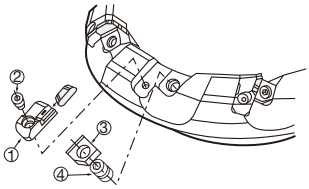
Arbor type

TME4406RI-E



SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
TME4403RI-E	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4404RI-E	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4405RI-E	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4
TME4406RI-E	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4



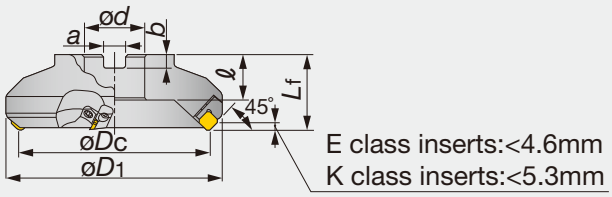
Reference pages

Inserts → **D147**, Standard cutting conditions → **D148**

TME4400RB

45˚ high dense face mills with wedg clamped high-posi square inserts

A.R. = +24˚, R.R. = -8˚ ~ -6˚



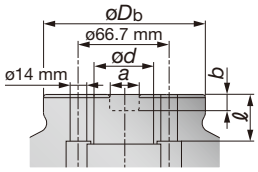
Right hand (R) shown.

Designation	Max. ap	øDc	z	øD1	Lf	ød	ℓ	a	b	Kg	Insert
TME4463RB-E	4	63	5	87.2	40	22	20	10.4	6.3	1.0	SE*N1203
TME4403RB-E	4	80	6	101.5	50	27	26	12.4	7	1.43	SE*N1203
TME4404RB-E	4	100	7	120.2	63	32	32	14.4	8	2.77	SE*N1203
TME4405RB-E	4	125	9	145.2	63	40	32	16.4	9	4.06	SE*N1203
TME4406RB-E	4	160	12	181.2	63	40	29	16.4	9	5.86	SE*N1203

Note: Cutting edge height (*Lf*) is for when SEEN1203AG*N type inserts are used.

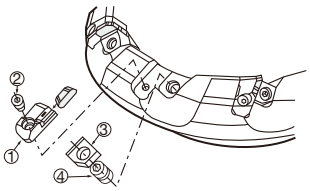
Arbor type

TME4406RB-E



SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
TME4463RB-E	LE444R	DS-8	CM4X0.7X14	WT402R	TP-4
TME4403 - 06RB-E	LE446R	FDS-8S	CM4X0.7X14	WF444R	TP-4



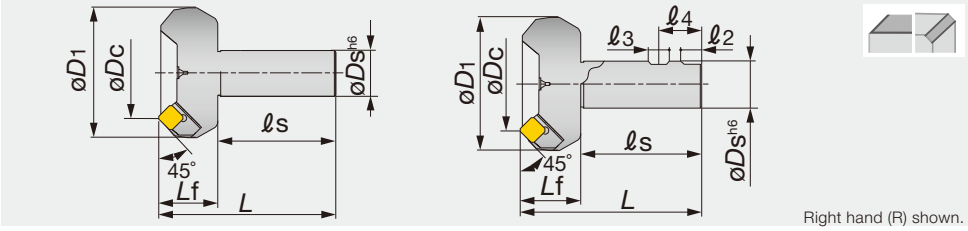
Reference pages

Inserts → **D147**, Standard cutting conditions → **D148**

EME4400

45° endmills with wedg clamped high-posi square inserts

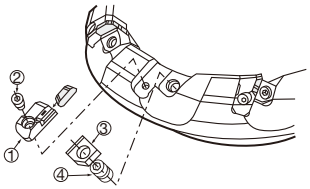
A.R. = +24°, R.R. = -13° ~ -8°



Designation	Max. ap	øDc	z	øD1	øDs	ℓs	Lf	L	ℓ2	ℓ3	ℓ4	Insert
EME4450R	4	50	3	73.4	32	80	40	120	-	-	-	SE*N1203...
EME4463R	4	63	4	87.2	32	80	40	120	-	-	-	SE*N1203...
EME4403RI	4	80	5	101.5	32	80	40	120	19	14	36	SE*N1203...
EME4404RI	4	100	5	120.2	32	80	40	120	19	14	36	SE*N1203...

SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
EME4400	LE444R	FDS-8S	CM4X0.7X14	WF444R	TP-4



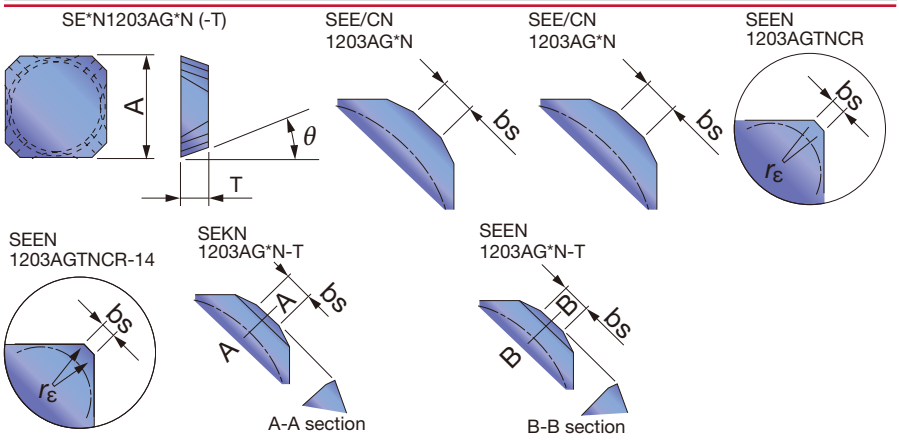
Face Milling

Reference pages

Inserts → **D147**, Standard cutting conditions → **D148**

INSERT

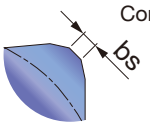
SECN/SEEN/SEKN 1203



SEKR1203-MJ

SEKR1203AGSR-MJ
SEKR1203AGPN-MS

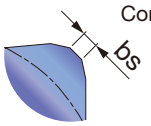
Corner detalls



SEKR1203-MS

SEKR1203AGSR-MJ
SEKR1203AGPN-MS

Corner detalls



P	Steel	☆	☆	☆	★	☆		★		★		☆		
M	Stainless		★	☆		☆								
K	Cast iron	★					★							
N	Non-ferrous												★	
S	Superalloys	☆	☆											
H	Hard materials													

★ : First choice
☆ : Second choice

Designation	Max. ap	Coated								Cermet		Uncoated						A	T	θ°	bs
		AH120	AH130	AH140	AH330	GH330	T1115	T3130		NS740		UX30	TH10								
SECN1203AGFN	4												●					12.7	3.18	20	2.4
SEEN1203AGFN	4												●					12.7	3.18	20	2.4
SEEN1203AGTN	4	●	●	●		●	●			●		●						12.7	3.18	20	2.4
SEEN1203AGTN-T	4							●		●		●						12.7	3.18	20	2.4
SEEN1203AGTNCR	4	●	●	●	●			●										12.7	3.18	20	1.6
SEEN1203AGTNCR-14	4									●								12.7	3.18	20	1.4
SEKN1203AGFN-T	4												●					12.7	3.18	20	1.6
SEKN1203AGTN	4	●	●	●	●	●		●		●		●						12.7	3.18	20	1.6
SEKN1203AGTN-T	4					●	●	●		●		●						12.7	3.18	20	1.6
SEKN1203AGTNCR	4									●								12.7	3.18	20	1.6
SEKR1203AGSR-MJ	4	●			●	●		●										12.7	3.18	20	1.6
SEKR1203AGPN-MS	4		●	●														12.7	3.18	20	1.6

●: Line up

Face Milling

STANDARD CUTTING CONDITIONS

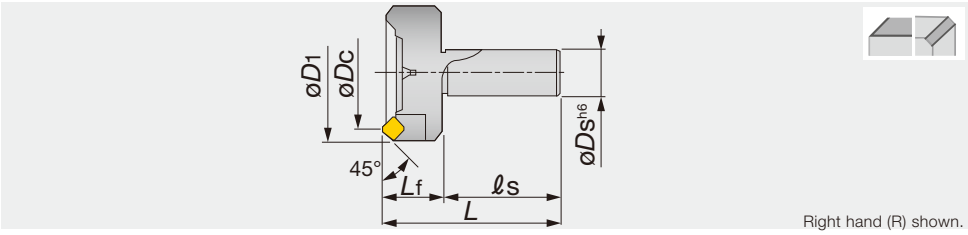
ISO	Workpiece material	Grade	Roughing (Depth of cut: *ap* 1.5 ~ 4 mm)		Finishing (Depth of cut: *ap* 0.3 ~ 0.7 mm)	
			Cutting speed *vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 250	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.25
		AH330	150 ~ 400	0.1 ~ 0.25	150 ~ 400	0.1 ~ 0.28
		AH120	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.28
		T3130	150 ~ 300	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
		AH130 · AH140	100 ~ 180	0.1 ~ 0.28	130 ~ 200	0.1 ~ 0.3
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.25	180 ~ 280	0.1 ~ 0.28
		NS740	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		AH330	100 ~ 320	0.1 ~ 0.23	150 ~ 320	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.23	150 ~ 200	0.1 ~ 0.25
	Die steels < 30 HRC	AH120 · T3130	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		AH330	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	80 ~ 180	0.15 ~ 0.25	100 ~ 200	0.15 ~ 0.28
		AH120 · GH330	150 ~ 230	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.1 ~ 0.2	30 ~ 60	0.1 ~ 0.2
	Heat-resistance alloys Inconel 718, etc.	AH120	10 ~ 40	0.05 ~ 0.15	10 ~ 40	0.05 ~ 0.1
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.2	350 ~ 1000	0.1 ~ 0.3
	Copper alloy	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

Notes:
- Dry cutting is recommended for all materials except for aluminium alloys.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.
- No. of revolutions (min^{-1}) = Cutting speed × 1000 ÷ 3.14 ÷ Cutter diameter
- Table feed (mm/min) = No. of revolutions × Feed per tooth × No. of inserts

EMD4400RI

45° endmills with wedge clamped square inserts

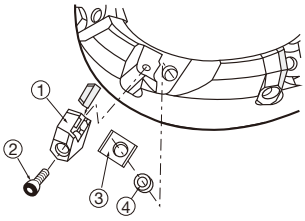
A.R. = +15°, R.R. = -3°



Designation	Max. ap	øDc	z	øD1	øDs	ℓs	Lf	L	Kg	Insert
EMD4403RI-S32	4	80	4	95	32	80	40	120	2	SD*N42.../SD*R1203.../ WDCN42ZFR-DIA

SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
EMD4403RI-S32	LD440R	FDS-8S	CM4X0.7X14	WP440R	TP-4



Face Milling

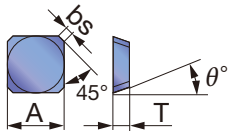
Reference pages

Inserts → **D150**, Standard cutting conditions → **D151**

INSERT

SDCN/SDEN/SDKN 42Z

General inserts
SD*N42Z*N



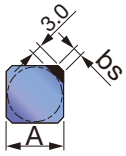
Corner details
SDKN42ZTN16

SD*N42ZTN20

SDKN42ZTNCR
SDEN42ZTNCR

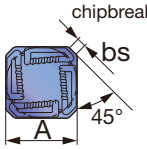
SDCN42ZFN-DIA

SDCN42ZFN-DIA



SDKR42Z-MJ

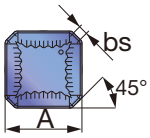
SDKR42ZSR-MJ
(With 3-dimensional chipbreaker)



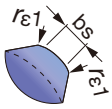
Corner details

SDMR/SDKR 1203-MJ

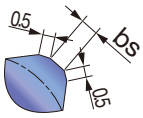
SD*R1203AETN-MJ
(With 3-dimensional chipbreaker)



Corner details
SDMR1203AETN-MJ

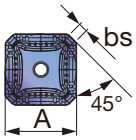


SDKR1203AETN-MJ

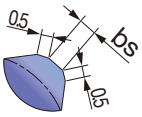


SDKR42Z-MS

SDKR42ZPN-MS

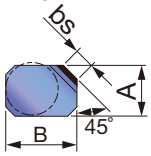


Corner details



WDCN42ZFR-DIA

Wiper inserts
WDCN42ZFR-DIA



		Coated								Cermet			Uncoated			PCD		
P	Steel	★			★	☆		★		★	☆		☆					
M	Stainless		★	☆														
K	Cast iron	★					★											
N	Non-ferrous													★		★		
S	Superalloys	★	☆															
H	Hard materials																	

★ : First choice
☆ : Second choice

Designation	Max. ap	AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740	N308	UX30	TH10	DX140	A	B	T	θ°	bs
SDCN42ZFN	4											●		12.7	-	3.18	15	1.2
SDCN42ZTN	4								●	●	●			12.7	-	3.18	15	1.2
SDCN42ZTN20	4								●					12.7	-	3.18	15	2
SDEN42ZFN	4											●		12.7	-	3.18	15	1.2
SDEN42ZTN	4	●		●		●	●		●	●	●			12.7	-	3.18	15	1.2
SDEN42ZTNCR	4	●		●	●				●					12.7	-	3.18	15	1.6
SDEN42ZTN20	4							●						12.7	-	3.18	15	2
SDKN42ZFN	4											●		12.7	-	3.18	15	1.2
SDKN42ZTN	4	●	●	●	●	●	●		●	●	●			12.7	-	3.18	15	1.2
SDKN42ZTNCR	4								●					12.7	-	3.18	15	1.6
SDKN42ZTN16	4							●						12.7	-	3.18	15	1.6
SDCN42ZFN-DIA	2												●	12.7	-	3.18	15	1.2
SDKR42ZSR-MJ	4	●			●	●		●						12.7	-	3.18	15	1.6
SDMR1203AETN-MJ	4								●					12.7	-	3.18	15	1.6
SDKR1203AETN-MJ	4								●					12.7	-	3.18	15	1.6
SDKR42ZPN-MS	4		●	●										12.7	-	3.18	15	1.6
WDCN42ZFR-DIA	0.5												●	12.2	15.64	3.18	15	4.9

●: Line up
DX140 : Package quantity = 1pc.

STANDARD CUTTING CONDITIONS

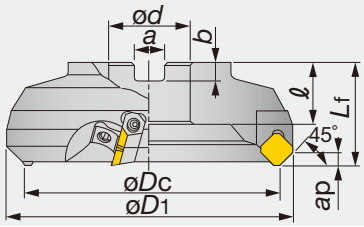
ISO	Workpiece material	Grade	Roughing (Depth of cut: *ap* 1.5 ~ 4 mm)		Finishing (Depth of cut: *ap* 0.3 ~ 0.7 mm)	
			Cutting speed *vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 250	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.25
		AH330	150 ~ 400	0.1 ~ 0.25	150 ~ 400	0.1 ~ 0.28
		AH120	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.28
		T3130	150 ~ 300	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
		AH130 · AH140	100 ~ 180	0.1 ~ 0.28	130 ~ 200	0.1 ~ 0.3
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.25	180 ~ 280	0.1 ~ 0.28
		NS740 · N308	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		AH330	100 ~ 320	0.1 ~ 0.23	150 ~ 320	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.23	150 ~ 200	0.1 ~ 0.25
		UX30	80 ~ 130	0.1 ~ 0.25	100 ~ 150	0.1 ~ 0.28
	Die steels < 30 HRC	AH120 · T3130	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		AH330	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	80 ~ 180	0.15 ~ 0.25	100 ~ 200	0.15 ~ 0.28
		AH120 · GH330	150 ~ 230	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
S	Titanium alloys Ti-6Al-4V, etc.	AH130	30 ~ 60	0.1 ~ 0.2	30 ~ 60	0.1 ~ 0.2
	Heat-resistance alloys Inconel 718, etc.	AH120	10 ~ 40	0.05 ~ 0.15	10 ~ 40	0.05 ~ 0.1
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.2	350 ~ 1000	0.1 ~ 0.3
		DX140	200 ~ 1000	0.05 ~ 0.18	350 ~ 1000	0.1 ~ 0.2
	Copper alloy	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

Note: • Dry cutting is recommended for all materials except for aluminium alloys.
• Maximum depth of cut for DX140 SDCN42ZFN-DIA is 2 mm.
• When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.

TMD5400RI

45˚ face mills with wedge clamped square inserts

A.R. = +15˚, R.R. = -3˚



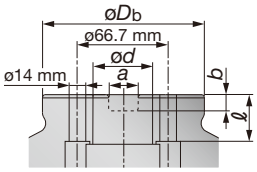
Right hand (R) shown.

Designation	Max. ap	øDc	z	øD1	Lf	ød	ℓ	a	b	Kg	Insert
TMD5404RI-E	6	100	4	118	63	32	32	14.4	8	2.5	SD*N53Z...
TMD5405RI-E	6	125	6	142	63	40	32	16.4	9	3.7	SD*N53Z...
TMD5406RI-E	6	160	6	176	63	40	29	16.4	9	5.8	SD*N53Z...
TMD5408RI-E	6	200	8	216	63	60	38	25.7	14	9	SD*N53Z...
TMD5410RI-E	6	250	10	265	63	60	38	25.7	14	16.3	SD*N53Z...
TMD5412RI-E	6	315	12	330	63	60	38	25.7	14	25.2	SD*N53Z...

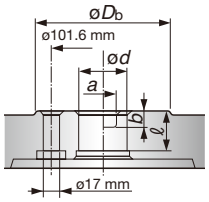
Face Milling

Arbor type

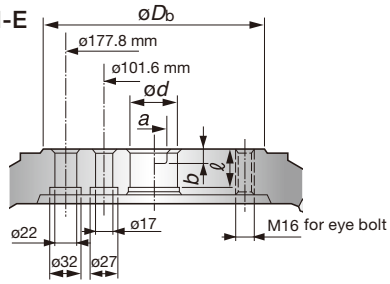
TMD5406RI-E



TMD5408/10...

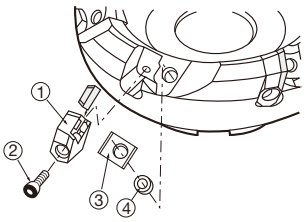


TMD5412RI-E



SPARE PARTS

Designation	① Locator	④ Wedge fixing screw	② Locator fixing screw	③ Wedge	Wrench
TMD54**RI*	LD540R	FDS-8S	CM4X0.7X20	WF500R	TP-4



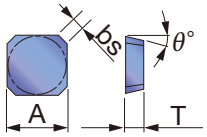
Reference pages

Inserts, Standard cutting conditions → **D153**

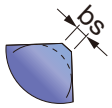
INSERT

SDCN/SDEN 53Z

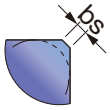
SD*N53Z*N



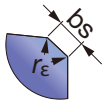
SDEN53ZTN20
Corner details



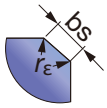
SDKN53ZTN16
Corner details



SDEN53ZTNCR
Corner details

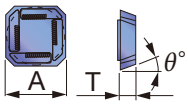


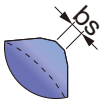
SDKN53ZTNCR
Corner details



SDKR53-MJ

SDKR53ZSR-MJ
(With 3-dimensional chipbreaker)





		AH120	AH130	AH140	GH330	T3130	NS740	N308	UX30	TH10
		Coated					Cermet		Uncoated	
P	Steel	☆				★	★	☆	☆	
M	Stainless		★	☆	☆					
K	Cast iron	★								
N	Non-ferrous									★
S	Superalloys									
H	Hard materials									

★ : First choice
☆ : Second choice

Designation	Max. ap	AH120	AH130	AH140	GH330	T3130	NS740	N308	UX30	TH10	A	T	θ°	bs
SDCN53ZTN	6						●	●			15.875	4.76	15	1.2
SDEN53ZFN	6									●	15.875	4.76	15	1.2
SDEN53ZTN	6				●		●		●		15.875	4.76	15	1.2
SDEN53ZTNCR	6						●				15.875	4.76	15	1.4
SDEN53ZTN20	6					●					15.875	4.76	15	2
SDKN53ZFN	6									●	15.875	4.76	15	1.2
SDKN53ZTN	6	●	●	●	●		●	●	●		15.875	4.76	15	1.2
SDKN53ZTNCR	6						●				15.875	4.76	15	1.6
SDKN53ZTN16	6					●					15.875	4.76	15	1.6
SDKR53ZSR-MJ	6				●	●					15.875	4.76	15	2

●: Line up

STANDARD CUTTING CONDITIONS

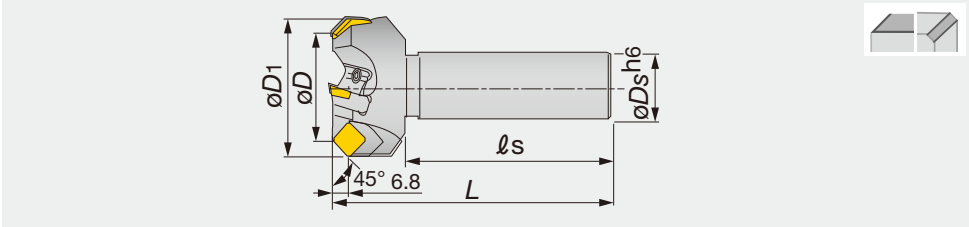
ISO	Workpiece material	Grade	Roughing (Depth of cut: ap 1.5 ~ 6 mm) Cutting speed vc (m/min)	Roughing Feed per tooth fz (mm/t)	Finishing (Depth of cut: ap 0.3 ~ 0.7 mm) Cutting speed vc (m/min)	Finishing Feed per tooth fz (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.3
		AH120	150 ~ 250	0.1 ~ 0.35	150 ~ 250	0.1 ~ 0.35
		T3130	150 ~ 300	0.1 ~ 0.35	180 ~ 300	0.1 ~ 0.35
		AH130	100 ~ 180	0.1 ~ 0.35	130 ~ 200	0.1 ~ 0.35
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.35	180 ~ 280	0.1 ~ 0.35
		NS740	100 ~ 180	0.1 ~ 0.25	150 ~ 200	0.1 ~ 0.3
		AH120	100 ~ 200	0.1 ~ 0.3	150 ~ 200	0.1 ~ 0.35
	Die steels < 30 HRC	T3130 · AH120	100 ~ 150	0.1 ~ 0.2	100 ~ 150	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	80 ~ 180	0.15 ~ 0.3	100 ~ 200	0.15 ~ 0.33
		GH330	150 ~ 230	0.15 ~ 0.3	200 ~ 250	0.15 ~ 0.3
K	Cast irons, Ductile cast irons	AH120	100 ~ 200	0.1 ~ 0.3	100 ~ 200	0.1 ~ 0.3
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.3	350 ~ 1000	0.1 ~ 0.3
	Copper alloys	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

Notes: • Dry cutting is recommended for all materials except for aluminium alloys.
• When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.

EGD4400

45° endmills with wedge clamped square inserts

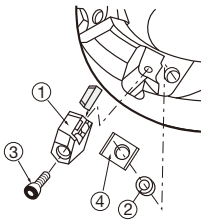
A.R. = +15°, R.R. = -3°



Designation	Max. *ap*	ø*Dc*	z	ø*D*1	ø*Ds*	ℓs	*Lf*	*L*	Kg	Insert
EGD4450R	4	50	4	67	32	80	35	115	1.1	SD*N42.../SD*R1203.../ WDCN42ZFR-DIA
EGD4463R	4	63	4	79	32	80	35	115	1.4	SD*N42.../SD*R1203.../ WDCN42ZFR-DIA

SPARE PARTS

Designation	① Locator	② Wedge fixing screw	③ Screw	④ Wedge	Wrench
EGD4400	LD442R	DS-8	BM3X0.5X6	WP193TR	TP-4



Face Milling

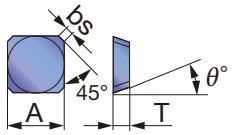
Reference pages

Inserts → **D155**, Standard cutting conditions → **D156**

INSERT

SDCN/SDEN/SDKN 42Z

General inserts
SD*N42Z*N



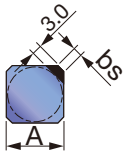
Corner details
SDKN42ZTN16

SD*N42ZTN20

SDKN42ZTNCR
SDEN42ZTNCR

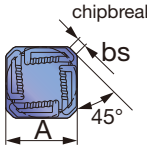
SDCN42ZFN-DIA

SDCN42ZFN-DIA



SDKR42Z-MJ

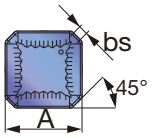
SDKR42ZSR-MJ
(With 3-dimensional chipbreaker)



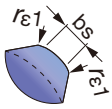
Corner details

SDMR/SDKR 1203-MJ

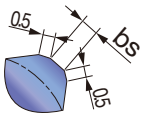
SD*R1203AETN-MJ
(With 3-dimensional chipbreaker)



Corner details
SDMR1203AETN-MJ

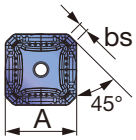


SDKR1203AETN-MJ

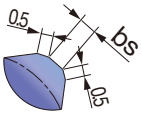


SDKR42Z-MS

SDKR42ZPN-MS

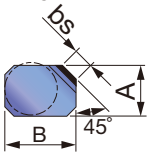


Corner details



WDCN42ZFR-DIA

Wiper inserts
WDCN42ZFR-DIA



P	Steel	★			★	☆		★		★	☆		☆					
M	Stainless		★	☆														
K	Cast iron	★					★											
N	Non-ferrous													★		★		
S	Superalloys																	
H	Hard materials																	

★ : First choice
☆ : Second choice

Designation	Max. ap	Coated							Cermet		Uncoated		PCD		A	B	T	θ°	bs
		AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740	N308	UX30	TH10	DX140						
SDCN42ZFN	4											●			12.7	-	3.18	15	1.2
SDCN42ZTN	4								●	●	●				12.7	-	3.18	15	1.2
SDCN42ZTN20	4								●						12.7	-	3.18	15	2
SDEN42ZFN	4											●			12.7	-	3.18	15	1.2
SDEN42ZTN	4	●		●		●	●		●	●	●				12.7	-	3.18	15	1.2
SDEN42ZTNCR	4	●		●	●				●						12.7	-	3.18	15	1.6
SDEN42ZTN20	4							●							12.7	-	3.18	15	2
SDKN42ZFN	4											●			12.7	-	3.18	15	1.2
SDKN42ZTN	4	●	●	●	●	●	●		●	●	●				12.7	-	3.18	15	1.2
SDKN42ZTNCR	4								●						12.7	-	3.18	15	1.6
SDKN42ZTN16	4							●							12.7	-	3.18	15	1.6
SDCN42ZFN-DIA	2												●		12.7	-	3.18	15	1.2
SDKR42ZSR-MJ	4	●			●	●		●							12.7	-	3.18	15	1.6
SDMR1203AETN-MJ	4								●						12.7	-	3.18	15	1.6
SDKR1203AETN-MJ	4								●						12.7	-	3.18	15	1.6
SDKR42ZPN-MS	4		●	●											12.7	-	3.18	15	1.6
WDCN42ZFR-DIA	0.5												●		12.2	15.64	3.18	15	4.9

●: Line up
DX140 : Package quantity = 1pc.

STANDARD CUTTING CONDITIONS

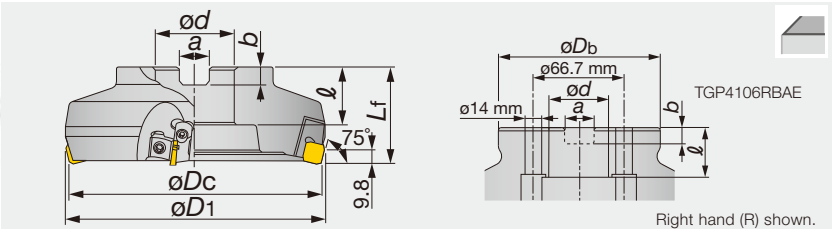
ISO	Workpiece material	Grade	Roughing (Depth of cut: *ap* 1.5 ~ 4 mm)		Finishing (Depth of cut: *ap* 0.3 ~ 0.7 mm)	
			Cutting speed *vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740	150 ~ 300	0.1 ~ 0.2	150 ~ 300	0.1 ~ 0.25
		AH330	150 ~ 400	0.1 ~ 0.25	150 ~ 400	0.1 ~ 0.28
		AH120	150 ~ 250	0.1 ~ 0.25	150 ~ 250	0.1 ~ 0.28
		T3130	150 ~ 280	0.1 ~ 0.28	180 ~ 300	0.1 ~ 0.3
		AH130 · AH140	100 ~ 180	0.1 ~ 0.28	130 ~ 200	0.1 ~ 0.3
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 230	0.1 ~ 0.25	180 ~ 280	0.1 ~ 0.28
		NS740	100 ~ 230	0.1 ~ 0.18	150 ~ 230	0.1 ~ 0.23
		AH330	100 ~ 320	0.1 ~ 0.23	150 ~ 320	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.23	150 ~ 200	0.1 ~ 0.25
	Die steels < 30 HRC	AH120	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		AH330	100 ~ 250	0.1 ~ 0.15	100 ~ 250	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH130 · AH140	80 ~ 180	0.15 ~ 0.25	100 ~ 200	0.15 ~ 0.28
		AH120	150 ~ 230	0.15 ~ 0.23	200 ~ 250	0.15 ~ 0.25
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		AH120	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.2	350 ~ 1000	0.1 ~ 0.3
		DX140	200 ~ 1000	0.05 ~ 0.18	350 ~ 1000	0.1 ~ 0.2
	Copper alloy	TH10	200 ~ 500	0.1 ~ 0.2	200 ~ 500	0.1 ~ 0.25

Note:
- Dry cutting is recommended for all materials except for aluminium alloys.
- Maximum depth of cut for DX140 SDCN42ZFN-DIA is 2 mm.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.
- No. of revolutions (min^{-1}) = Cutting speed x 1000 ÷ 3.14 ÷ Cutter diameter
- Table feed (mm/min) = No. of revolutions x Feed per tooth x No. of inserts

TGP4100RIA/BA/RBAE

75° face mills with wedge clamped square inserts

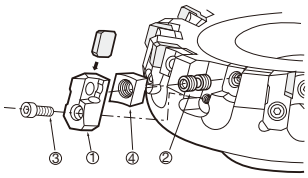
A.R. = +7°, R.R. = +1°



Designation	Max. ap	øDc	z	øD1	Lf	ød	ℓ	a	b	Kg	Insert
TGP4104RBAE	7	100	8	108	63	32	25	14.4	8	2.4	SP*N42...
TGP4105RBAE	7	125	10	132	63	40	32	16.4	9	3.6	SP*N42...
TGP4106RBAE	7	160	12	167	63	40	29	16.4	9	5.8	SP*N42...

SPARE PARTS

Designation	①Locator	②Wedge fixing screw	③Locator fixing screw	④Wedge	Wrench
TGP4104, 05, 06RBAE	LP413R	FDS-8S	CM4X0.7X14	WF310R	TP-4



INSERT

SPCN/SPEN/SPKN 42S

SP*N42S*R/L

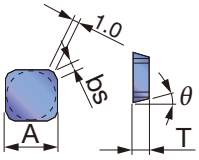


Fig.1

SPEN423*N
Corner details

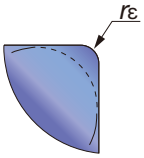


Fig.2

SPKR42SSR-MJ
(With 3-dimensional chipbreaker)

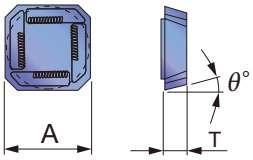
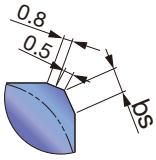


Fig.3

Corner details



WPAN42SFRS
Wiper insert one-corner type

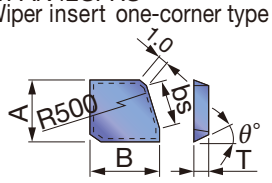


Fig.4

WPAN42SFR
Two-corner type

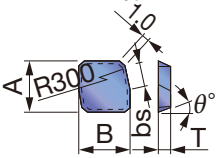


Fig.5

Right hand (R) shown.

P	Steel	☆		☆		★		★	☆				☆				
M	Stainless	☆	★										☆				
K	Cast iron				★						★		☆	☆			
N	Non-ferrous																
S	Superalloys																
H	Hard materials																

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated					Cermet		Ceramic	Uncoated		A	B	T	θ°	bs	Fig.
			AH120	AH140	GH330	T1115	T3130	NS740	N308	FX105	UX30	TH10						
SPCN42STR	0	7						●	●		●		12.7	-	3.18	11	1.4	1
SPCN42SFR	0	7										●	12.7	-	3.18	11	1.4	1
SPEN42STR	0	7						●					12.7	-	3.18	11	1.4	1
SPKN42STR	0	7	●	●	●	●	●	●	●	●*	●		12.7	-	3.18	11	1.4	1
SPKN42STL	0	7						●			●		12.7	-	3.18	11	1.4	1
SPKN42SFR	0	7										●	12.7	-	3.18	11	1.4	1
SPKN42SFL	0	7										●	12.7	-	3.18	11	1.4	1
SPKR42SSR-MJ	0	7			●	●	●						12.7	-	3.18	11	0	3
WPAN42SFR	0	-							●			●	12.4	14.9	3.18	11	5.2	5
WPAN42SFRS	0	-										●	12.4	13.8	3.18	11	9.6	4
SPGN120312TN	1.2	7								●*			12.7	-	3.18	11	-	2
SPEN423TN	1.2	7					●	●			●		12.7	-	3.18	11	-	2
SPEN423FN	1.2	7										●	12.7	-	3.18	11	-	2

Note: * marked inserts should not be used with wiper inserts.

●: Line up

Reference pages

Standard cutting conditions → D158

STANDARD CUTTING CONDITIONS

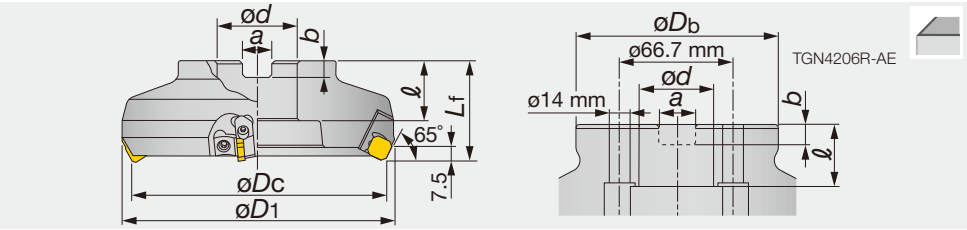
ISO	Workpiece material	Grade	Roughing (Depth of cut: *ap* 1.5 ~ 4 mm)		Finishing (Depth of cut: *ap* 0.3 ~ 0.7 mm)	
			Cutting speed *vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	NS740 · N308	150 ~ 250	0.1 ~ 0.18	150 ~ 250	0.1 ~ 0.23
		AH120 · GH330	150 ~ 250	0.1 ~ 0.23	150 ~ 250	0.1 ~ 0.25
		T3130	150 ~ 300	0.1 ~ 0.25	180 ~ 300	0.1 ~ 0.28
		UX30	100 ~ 180	0.1 ~ 0.25	130 ~ 200	0.1 ~ 0.28
	Carbon steels Alloy steels < 300 HB	T3130	150 ~ 280	0.1 ~ 0.23	180 ~ 280	0.1 ~ 0.25
		NS740 · N308	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		AH330 · AH120	100 ~ 200	0.1 ~ 0.2	150 ~ 200	0.1 ~ 0.23
		UX30	80 ~ 130	0.1 ~ 0.23	100 ~ 150	0.1 ~ 0.25
	Carbon steels Alloy steels > 300 HB	T3130 · GH330	150 ~ 230	0.1 ~ 0.23	180 ~ 280	0.1 ~ 0.25
		NS740 · N308	100 ~ 180	0.1 ~ 0.18	150 ~ 200	0.1 ~ 0.23
		UX30	80 ~ 130	0.1 ~ 0.23	100 ~ 150	0.1 ~ 0.25
	Die steels < 30 HRC	T3130	100 ~ 150	0.1 ~ 0.15	100 ~ 150	0.1 ~ 0.2
		UX30	80 ~ 130	0.1 ~ 0.15	80 ~ 130	0.1 ~ 0.2
M	Stainless steels < 250 HB	AH120 · AH140	150 ~ 230	0.15 ~ 0.2	200 ~ 250	0.15 ~ 0.23
		UX30	150 ~ 180	0.15 ~ 0.2	180 ~ 200	0.15 ~ 0.23
K	Cast irons Ductile cast irons	T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.23
		TH10 · UX30	80 ~ 130	0.1 ~ 0.2	80 ~ 130	0.1 ~ 0.23
		FX105	200 ~ 500	0.1 ~ 0.2	200 ~ 600	0.1 ~ 0.3

Notes:
- Dry cutting is recommended for above materials.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.
- No. of revolutions (min^{-1}) = Cutting speed x 1000 ÷ 3.14 ÷ Cutter diameter
- Table feed (mm/min) = No. of revolutions x Feed per tooth x No. of inserts

TGN4200R-A

65° wedge type face mill with negative square insert

A.R. = -5°, R.R. = -5°



Designation	Max. ap	øDc	z	øD1	Lf	ød	ℓ	a	b	Kg	Insert
TGN4203R-AE	6	80	5	92	50	27	22	12.4	7	1.5	SN*N43Z*/SNMN1204...
TGN4204R-AE	6	100	6	112	63	32	32	14.4	8	2.4	SN*N43Z*/SNMN1204...
TGN4205R-AE	6	125	8	136	63	40	32	16.4	9	3.9	SN*N43Z*/SNMN1204...
TGN4206R-AE	6	160	10	171	63	40	29	16.4	9	6.1	SN*N43Z*/SNMN1204...

SPARE PARTS

Designation	Locator	Right-left screw	Screw	Wedge	Wrench
TGN42...	LN423R	FDS-8S	CM4X0.7X14	WP440R	TP-4

INSERT

SNCN/SNKN43Z

SN*N43Z*N

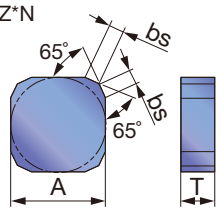


Fig.1

SNMN1204-TN

SN*N43Z*N

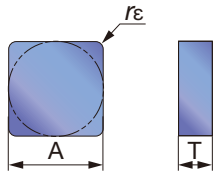


Fig.2

SNKF43Z

SNKF43Z*N

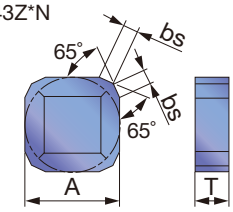


Fig.3

		Coated				Cermet			Ceramic			Uncoated			
P	Steel		★			★	☆					☆			
M	Stainless														
K	Cast iron	★							★			☆	☆		
N	Non-ferrous												☆		
S	Superalloys														
H	Hard materials														

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	T1115	T3130	NS740	N308	FX105	UX30	TH10	A	T	bs	Fig.
SNCN43ZFN	-	6							●	12.7	4.76	2	1
SNCN43ZTN	-	6			●	●		●		12.7	4.76	2	1
SNKF43ZFN	-	6							●	12.7	4.76	2	3
SNKF43ZTN	-	6	●					●		12.7	4.76	2	3
SNKN43ZTN	-	6	●	●	●		●	●		12.7	4.76	2	1
SNMN120408TN	0.8	6					●			12.7	4.76	-	2
SNMN120412TN	1.2	6	●	●			●	●		12.7	4.76	-	2
SNMN120416TN	1.6	6					●			12.7	4.76	-	2
SNMN120420TN	2	6					●			12.7	4.76	-	2
SNMN120424TN	2.4	6					●			12.7	4.76	-	2

Notes: Inserts can be used for former PS-series TAC mills.

●: Line up

Reference pages

Standard cutting conditions → **D160**

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Roughing (Depth of cut: 1.5 ~ 4 mm)		Finishing (Depth of cut: 0.3 ~ 0.7 mm)	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Mild steels Unhardened steels < 180 HB	T3130	150 ~ 250	0.1 ~ 0.3	180 ~ 250	0.1 ~ 0.3
		NS740 · N308	100 ~ 200	0.1 ~ 0.2	150 ~ 250	0.1 ~ 0.25
		UX30	100 ~ 180	0.1 ~ 0.3	130 ~ 200	0.1 ~ 0.3
	Carbon steels Alloy steels < 300 HB	T3130	130 ~ 250	0.1 ~ 0.3	150 ~ 250	0.1 ~ 0.3
		NS740 · N308	100 ~ 180	0.1 ~ 0.2	150 ~ 200	0.1 ~ 0.25
		UX30	80 ~ 130	0.1 ~ 0.3	100 ~ 150	0.1 ~ 0.3
K	Cast irons Ductile cast irons	TH10 · UX30	80 ~ 130	0.1 ~ 0.25	80 ~ 130	0.1 ~ 0.3
		T1115	100 ~ 200	0.1 ~ 0.2	100 ~ 200	0.1 ~ 0.25
		FX105	200 ~ 500	0.1 ~ 0.35	200 ~ 600	0.1 ~ 0.4
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.05 ~ 0.2	350 ~ 1000	0.1 ~ 0.3

Notes:
- Dry cutting is recommended for above materials.
- When wet machining mild steels, carbon steels and alloy steels, use T3130 at lower cutting conditions.

The world's highest level repeatability

S-TAQ System

● Improved surface quality and increased tool life

- Two-face restricted (1/10 short taper and flange face) coupling.
- High-level coupling performance contributes to high accuracy and excellent rigidity.
- Excellent dynamic balance reduces vibration, chatter, and cutting noise at high speeds.

● Improved productivity

- High speed machining can reduce machining time.
- High repeatability can eliminate trial cut.

● Labor-saving tool change

- Can eliminate detaching the toolholder from the main spindle.
- Can eliminate the brakes for the main spindle.
- Labor-saving clamping by only one T-wrench.

Performance

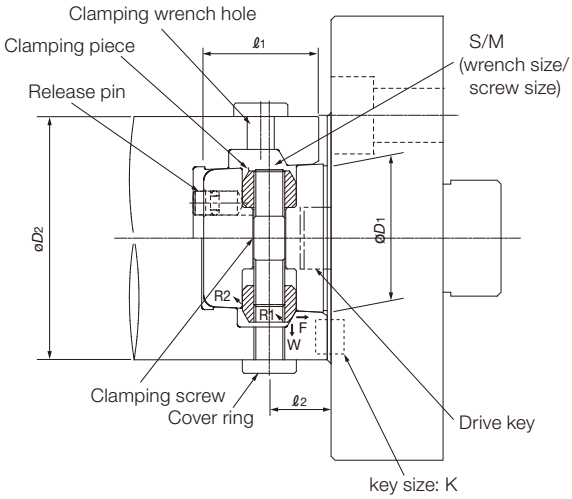
Original clamp system provides high rigidity, accuracy and operating speed.

● Clamping force (Strong clamp system)

· Lubricant coating on clamping piece.
· 4-points balancing clamp.
· Sufficient clamping for the smaller diameter part of taper.

Designation	Dimensions (mm) øD1	øD2	ℓ1	ℓ2	S/M	K	Recommend clamping torque (N·m)	Clamping force (N)
TAQ32	19	32	18	8.5	3/M6	8	3	4×10^3
TAQ40	24	40	21	10	3/M6	1 0	5	5.5×10^3
TAQ50	30	50	25	12	4/M8	12	8	9×10^3
TAQ63	38	63	32	15	4/M8	16	10	12×10^3
TAQ80	48	80	40	18	5/M10	18	20	18×10^3
TAQ100	60	100	50	22	6/M12	20	30	23×10^3

Part assembly



W: Driving force by clamping screw
F: Clamping force
R1 = R2: Receiving force of clamping piece

DATA

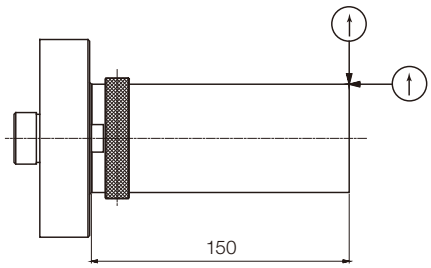
Comparison of clamping force

	Taper	Taper dia.(mm)/holder dia.(mm)	Recommend clamping torque (N/m)	Draw-in force (N)	Draw-in force / Torque (m-1)
TAQ63	1 / 10	38 / 63	10	12×10^3	1200
QC adapter	10°	35 / 70	20	9.8×10^3	490
Other makes A	4°	35 / 62	22.5	9.8×10^3	436

●Repeatability for accuracy

Radial run out	Within 0.003 mm
Axial run out	Within 0.002 mm

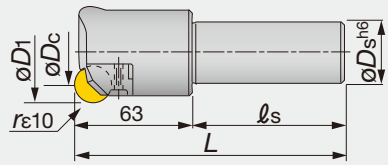
Note: Measured at 150 mm far from end face.



ERD6000

Indexable endmill with 20mm button insert

A.R. = +8°,R.R. = -2°~ +3°



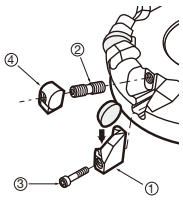
Right hand (R) shown.

Designation	Max. ap	øD1	z	øDc	øDs	ℓs	L	Insert
ERD6050RA	10	50	3	30	32	80	143	RD**2004...
ERD6063RA	10	63	3	43	32	80	143	RD**2004...

SPARE PARTS

Designation	①Locator	②Wedge fixing screw	③Locator fixing screw	④Wedge	Wrench
ERD60...	LR602R	FDS-6Z	SHCM4-16	WR602R	TP-3A

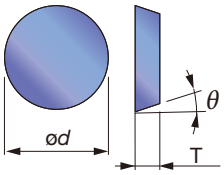
Note: Plunging up to 4mm depth is possible.



Face Milling

INSERT

RDCN/RDCA/RDKN2004



P	Steel	★		☆	
M	Stainless				
K	Cast iron	★			☆
N	Non-ferrous				☆
S	Superalloys				
H	Hard materials	★		☆	

★ : First choice
☆ : Second choice

Designation	Max. ap	Coated	Uncoated		A	T	θ°
		AH120	UX30	TH10			
RDCA2004TN	10		●		20	4.76	15
RDCN2004TN	10		●		20	4.76	15
RDKN2004FN	10			●	20	4.76	15
RDKN2004TN	10	●	●		20	4.76	15

The above figure shows RD*N-type insert.
• RDCA type inserts have a hole.
Note: The inserts can be used for the former PS series.

●: Line up

Reference pages

Standard cutting conditions → **D163**

STANDARD CUTTING CONDITIONS

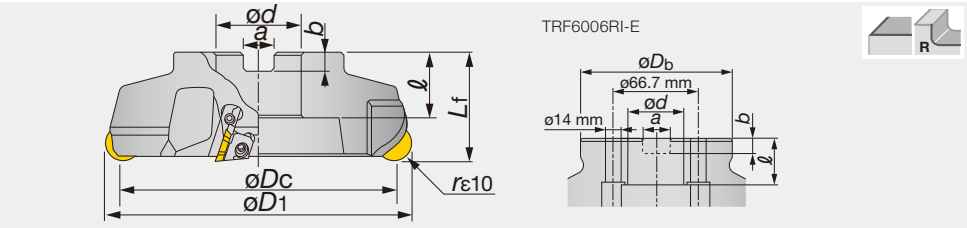
ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Depth of cut: 0.4 ~ 1 Feed per tooth *fz* (mm/t)	Depth of cut: 1.5 ~ 3 Feed per tooth *fz* (mm/t)	Depth of cut: 4 ~ 6 Feed per tooth *fz* (mm/t)
P	Carbon steels, alloy steels < 300HB	AH120	150 ~ 250	0.3 ~ 0.5	0.2 ~ 0.3	0.1 ~ 0.2
		UX30	80 ~ 150	0.3 ~ 0.6	0.2 ~ 0.3	0.1 ~ 0.2
	Die steels < 30HRC	AH120	100 ~ 150	0.2 ~ 0.4	0.15 ~ 0.3	0.1 ~ 0.2
		UX30	80 ~ 130	0.25 ~ 0.5	0.15 ~ 0.3	0.1 ~ 0.2
K	Grey cast irons, ductile cast irons	AH120	100 ~ 150	0.3 ~ 0.6	0.2 ~ 0.4	0.1 ~ 0.25
		TH10	80 ~ 130	0.3 ~ 0.6	0.2 ~ 0.4	0.1 ~ 0.25
N	Aluminium alloys Si < 13%	TH10	200 ~ 1000	0.1 ~ 0.5	0.1 ~ 0.4	0.1 ~ 0.25
H	Hardened steels 40 ~ 55HRC	AH120	20 ~ 60	0.1 ~ 0.2	0.05 ~ 0.2	-
		UX30	20 ~ 60	0.1 ~ 0.2	0.05 ~ 0.2	-

Note: Feed rate should be inversely proportional to depth of cut and selected depending on machine rigidity.

TRF6000

Face mill with 20mm high posi-rake button insert

A.R. = +19°,R.R. = +3°



Designation	Max. ap	øDc	z	øD1	Lf	ød	ℓ	a	b	Kg	Insert
TRF6003RI-E	10	80	4	100	50	27	26	12.4	7	1.4	RFEN2004...
TRF6004RI-E	10	100	5	120	63	32	32	14.4	8	2.5	RFEN2004...
TRF6005RI-E	10	125	6	145	63	40	32	16.4	9	3.9	RFEN2004...
TRF6006RI-E	10	160	8	180	63	40	29	16.4	9	5.8	RFEN2004...

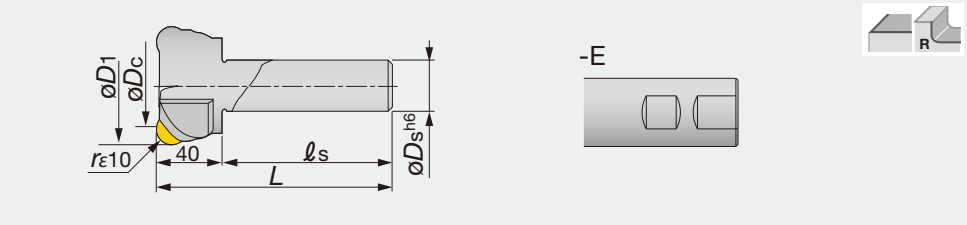
SPARE PARTS

Designation	①Locator	②Wedge fixing screw	③Locator fixing screw	④Wedge	Wrench
TRF6003 - 6006...	LF602R	FDS-8S	CM4X0.7X20	WF603R	TP-4

ERF6000

Indexable endmill with 20mm high posi-rake button insert for difficult-to-cut material

A.R. = +19°,R.R. = +3°

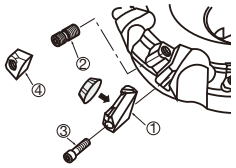


Designation	øDc	z	øD1	øDs	ℓs	L	Insert
ERF6050R	50	3	70	32	80	120	RFEN2004...
ERF6063R	63	4	83	32	80	120	RFEN2004...
ERF6050R-E	50	3	70	32	80	120	RFEN2004...
ERF6063R-E	63	4	83	32	80	120	RFEN2004...

SPARE PARTS

Designation	①Locator	②Wedge fixing screw	③Locator fixing screw	④Wedge	Wrench
ERF60...	LF602R	FDS-6Z	CM4X0.7X20	WF602R	TP-3A

Note: The above TAC Endmills are not irregular pitch spec.

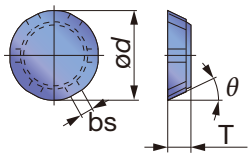


Reference pages

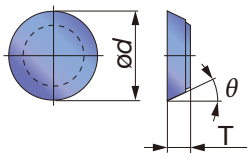
Inserts, Standard cutting conditions → **D165**

INSERT

RFEN2004



RFEN2004M0TN



		Coated			Un-coated	
P	Steel					
M	Stainless		★		☆	
K	Cast iron					
N	Non-ferrous					
S	Superalloys	★				☆
H	Hard materials	☆				☆

★ : First choice
☆ : Second choice

Designation	Max. ap	AH120	GH330		UX30	KS20	ød	T	θ°	bs
RFEN2004ZFTN	3	●	●		●	●	20	4.76	25	2.8
RFEN2004M0TN	10		●		●	●	20	4.76	25	-

●: Line up

Note: • RFEN2004M0TN type inserts should not be used for finishing requiring surface finish better than 12s.
• RFEN2004ZFTN type inserts can be used both finishing and roughing at depth of cut up to 3mm.
• RFEN2004M0TN does not have flattened flanks.

STANDARD CUTTING CONDITIONS

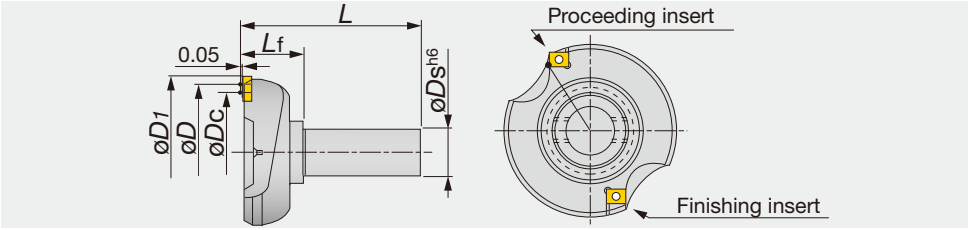
ISO	Workpiece material		Grade	Depth of cut = 1 ~ 3 mm: Cutting speed *vc*(m/min)	Depth of cut = 1 ~ 3 mm: Feed per tooth *fz* (mm/t)	Depth of cut = 0.4 ~ 1 mm: Cutting speed *vc*(m/min)	Depth of cut = 0.4 ~ 1 mm: Feed per tooth *fz* (mm/t)	Cutting fluid
M	Stainless steels	Austenitic, Ferritic X5CrNi18-9, etc. < 300HB	GH330	150 ~ 250	0.20 ~ 0.35	180 ~ 250	0.2 ~ 0.5	Dry cutting
			UX30	150 ~ 230	0.20 ~ 0.35	180 ~ 250	0.2 ~ 0.5	Dry cutting
		Precipitatio hardening X5CrNiCuNb16-4, etc. < 35HRC	GH330	150 ~ 200	0.15 ~ 0.3	180 ~ 250	0.2 ~ 0.4	Dry cutting
			UX30	130 ~ 180	0.15 ~ 0.3	150 ~ 200	0.2 ~ 0.4	Dry cutting
S	Superalloys Inconel, Hastelloy, etc.		AH120	20 ~ 30	0.10 ~ 0.15	20 ~ 50	0.2 ~ 0.4	Water insoluble type
	Titanium alloys Ti-6Al-4V, etc.		KS20	40 ~ 50	0.15 ~ 0.35	40 ~ 60	0.2 ~ 0.5	Water soluble type or dry cutting
H	Hard materials 40 ~ 50HRC		AH120	20 ~ 50	0.05 ~ 0.1	20 ~ 50	0.05 ~ 0.2	Water insoluble type

Note: Cutting width should be within 60 to 70 % of effective cutter diameter.
• No. of revolutions (min^{-1}) = Cutting speed × 1000 ÷ 3.14 ÷ Cutter diameter
• Table feed (mm/min) = No. of revolutions × Feed per tooth × No. of inserts

EMS09

Endmill with negative rectangle insert for highly precision finishing

A.R. = +10°, R.R. = -30°



Designation	Max. ap	øDc	z	øD	øD1	øDs	Lf	L	Insert
EMS09080R	0.2	80	2	92	100.7	32	40	120	LNCQ0906...

SPARE PARTS

Designation	Clamping screw	Wrench
EMS09080R	CSTB-4	T-15D

Face Milling

INSERT

LNCQ0906N-100(50)L

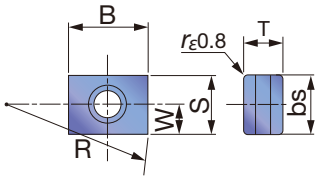


fig.1

LNCQ0906-50S

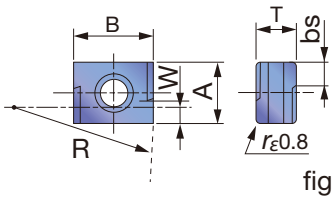


fig.2

		Coated			Cermet	
P	Steel	☆			★	
M	Stainless	★			★	
K	Cast iron	★	★			
N	Non-ferrous					
S	Superalloys					
H	Hard materials					

★ : First choice
☆ : Second choice

Designation	Max. ap	AH120	GH110	NS740	A	B	T	R	W	bs	fig
LNCQ0906N-100L	0.2	●	●	●	9.525	12.7	6.35	100	4.763	7.9	1
LNCQ0906N-50L	0.2	●	●	●	9.525	12.7	6.35	50	4.763	7.9	1
LNCQ0906R-50S	0.2	●	●	●	-	12.7	6.35	50	2.3	4	2

●: Line up

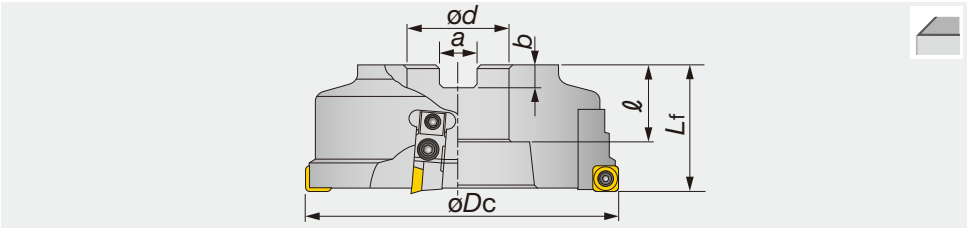
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed vc (m/min)	LNCQ0906N-100(50)L Depth of cut ap (mm)	LNCQ0906N-100(50)L Feed per tooth f (mm/rev)	LNCQ0906R-50S Depth of cut ap (mm)	LNCQ0906R-50S Feed per tooth f (mm/rev)
P	Mild steels E275A, etc. < 180 HB	NS740	200 ~ 300	< 0.2	2 ~ 6	≤0.2	1 ~ 2.5
	Carbon steels C55, etc. < 300 HB	NS740	150 ~ 250				
	Alloy steels 42CrMo4, etc. < 300 HB	NS740	120 ~ 200				
	Die steels X40CrMoV5-1, etc. < 300 HB	NS740	100 ~ 150				
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-3, etc.	AH120 NS740	150 ~ 220	< 0.2	2 ~ 6	≤0.2	1 ~ 2.5
K	Cast irons 250, etc.	GH110 AH120	120 ~ 200	< 0.2	2 ~ 6	≤0.2	1 ~ 2.5

SFP4000R

Face mills with adjustable structure for super finishing

A.R. = +5°,R.R. = -20°



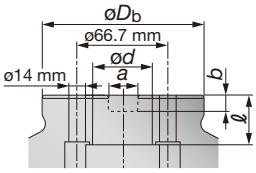
Designation	Max. ap	øDc	z	Lf	ød	ℓ	a	b	Kg	Insert
SFP4004R-E	0.1	100	2	63	32	32	14.4	8	2.3	SPHA435FNW
SFP4005R-E	0.1	125	2	63	40	32	16.4	9	3.5	SPHA435FNW
SFP4006R-E	0.1	160	4	63	40	29	16.4	9	5.8	SPHA435FNW

SPARE PARTS

Designation	Clamping screw	Locator	Right-left screw	Locator fixing screw	Socket-head screw	Wedge	Wrench	Washer	Washer 1	Wrench 1
SFP40...	CSTA-5S	LW400R	FDS-8S	CM5X0.8X16	CM5X0.8X8	FW-305	T-15D	5S	L5	P-4

Arbor type

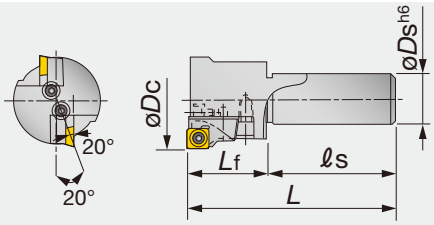
SFP4006R-E



EFP4000R

Endmills with adjustable structure for super finishing

A.R. = +5°, R.R. = -20°



Designation	Max. ap	øDc	z	øDs	ℓs	L	Lf	Insert
EFP4050R	0.1	50	1	32	80	120	40	SPHA435FNW
EFP4063R	0.1	63	2	32	80	130	50	SPHA435FNW

EFP4050R doesn't have adjustable system.

SPARE PARTS

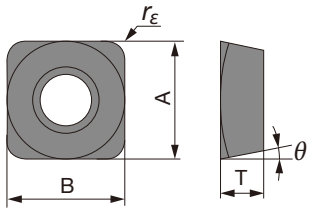
Designation	Clamping Screw	Locator	Right-left screw	Locator fixing screw	Socket-head screw	Wedge	Wrench	Washer	Washer 1	Wrench 1
EFP4050R	CSTA-5S	LW402R	-	CM5X0.8X16	-	-	T-15D	-	-	-
EFP4063R	CSTA-5S	LW400R	FDS-8S	CM5X0.8X16	CM5X0.8X18	FW-305	T-15D	5S	L5	P-4

Reference pages

Inserts, Standard cutting conditions → **D168**

INSERT

SPHA435



P	Steel	★	
M	Stainless	★	
K	Cast iron		★
N	Non-ferrous		★
S	Superalloys		
H	Hard materials		

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Cermet N308	Un-coated TH10	A	B	T	θ°
SPHA435FNW	2	0.1	●	●	12.7	12.7	4.76	11

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed Vc (m/min)	Feed per revolution f (mm/rev) SFP	Feed per revolution f (mm/rev) EFP	Depth of cut ap (mm)
P	Mild steels	N308	180 ~ 250	≤6	≤4	≤0.1
	Carbon steels	N308	150 ~ 200	≤6	≤4	≤0.1
	Alloy steels	N308	150 ~ 200	≤6	≤4	≤0.1
M	Stainless steels	N308	160 ~ 200	≤4	≤3	≤0.1
K	Cast irons	TH10	100 ~ 150	≤5	≤3	≤0.2
N	Non-ferrous metals	TH10	200 ~ 500	≤6	≤4	≤0.1

Note:
Under above conditions, attainable surface roughness is 3 to 4 μm *Rz*JIS for steels and 6 ~ 12 μm *Rz*JIS for cast irons.
• No. of revolutions (min^{-1}) = Cutting speed × 1000 ÷ 3.14 ÷ Cutter diameter
• Table feed (mm/min) = No. of revolutions × Feed per tooth × No. of inserts

MEMO

MillLine - Slot Milling

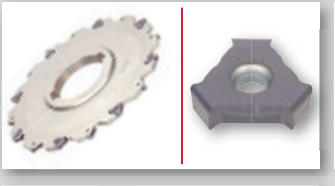
TUNGMINISLIT

D172

Thin width slitting cutter with self-clamping insert

ø63 - ø125 mm
Slot width 1.6 - 4.1 mm

P M K



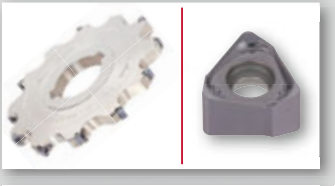
TUNGTHINSLIT

D175

Slot milling cutters available in axial drive type working with 6-cornered tangentially mounted inserts

ø80 - ø200 mm
Slot width 4 - 8 mm

P M K S



TUNGUNIVERSALSLOT

D177

Axial and radial drive type slot milling cutters with 6-cornered radially mounted inserts

ø80 - ø160 mm
Slot width 9 - 16 mm

P M K S

TECTANGENTIALSLOT

D180

Axial and radial drive type slot milling cutters for wider slots with tangentially mounted inserts

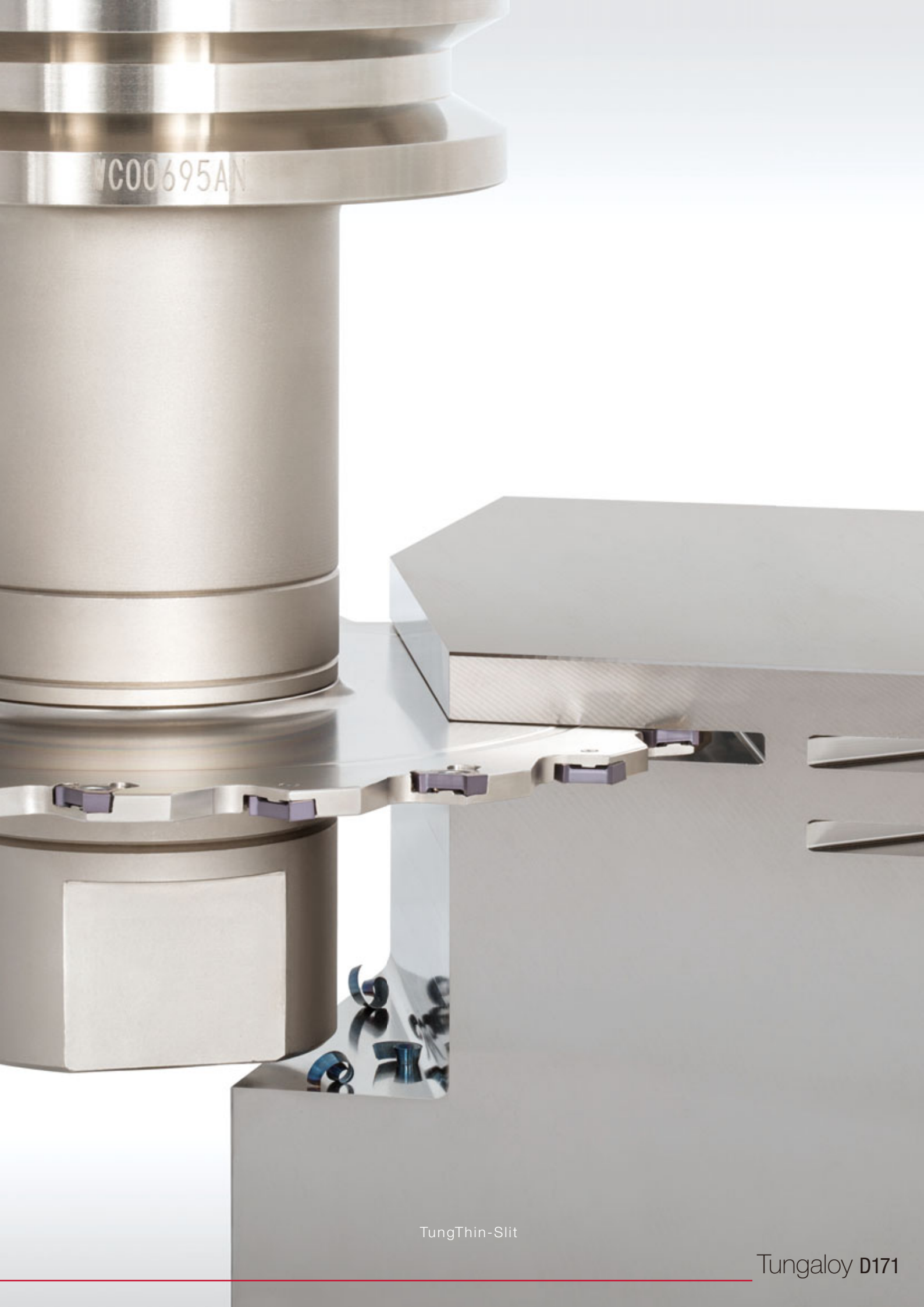
ø100 - ø250 mm
Slot width 16 - 25 mm

P M K S

Other Slot Milling Tools

D183

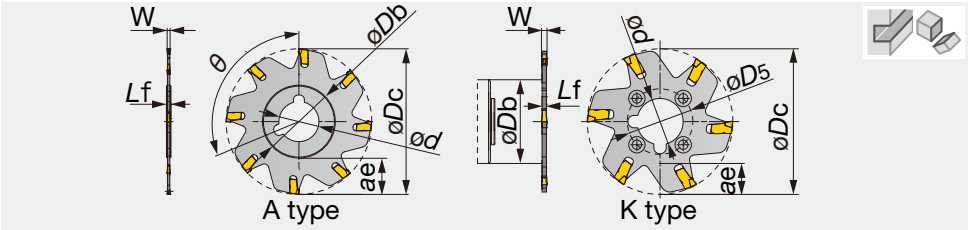
SVN4000



TungThin-Slit

S/ASG

Side cutter for thin slitting and cutting off



Designation	W min	W max	øDc	z	øDb	ød	øD5	Lf	Max. ae	θ°	SS	SS	Drive flange	type	Insert
SSG01R063-E1.6	1.6	1.6	63	6	32	10	22	2.4	14	0	SW25-32	SW1.00-32	-	K	SSS16N
ASG01N080-E1.6	1.6	1.6	80	8	39	22	-	2.4	16	112.5	-	-	-	A	SSS16N
ASG01N100-E1.6	1.6	1.6	100	10	39	22	-	2.4	30	90	-	-	-	A	SSS16N
ASG01N125-E1.6	1.6	1.6	125	12	64	27	-	2.4	30	75	-	-	-	A	SSS16N
SSG02R063-E2	1.85	2.5	63	6	32	10	22	2.4	15	0	SW25-32	SW1.00-32	-	K	SSM/S22N
ASG02N080-E2	1.85	2.5	80	8	39	22	-	2.4	20	112.5	-	-	-	A	SSM/S22N
ASG02N100-E2	1.85	2.5	100	10	39	22	-	2.4	30	90	-	-	-	A	SSM/S22N
ASG02N125-E2	1.85	2.5	125	12	60	27	-	2.4	32	75	-	-	-	A	SSM/S22N
SSG03R063-E3	2.65	3.5	63	5	32	10	22	2.4	15	0	SW25-32	SW1.00-32	-	K	SSM/S31N
SSG03R080-E3	2.65	3.5	80	6	40(1)	22	32	2.4	19(2)	0	SW32-40	-	R22-46	K	SSM/S31N
SSG03R100-E3	2.65	3.5	100	6	40(1)	22	32	2.4	29(3)	0	SW32-40	-	R22-46	K	SSM/S31N
SSG03R125-E3	2.65	3.5	125	8	55	32	45	2.4	34	0	S32-55	-	R32-55	K	SSM/S31N
SSG04R063-E4	4	4.5	63	5	32	10	22	3.2	15	0	SW25-32	SW1.00-32	-	K	SSM/S41N
SSG04R080-E4	4	4.5	80	6	40(1)	22	32	3.2	19(2)	0	SW32-40	-	R22-46	K	SSM/S41N
SSG04R100-E4	4	4.5	100	6	40(1)	22	32	3.2	29(3)	0	SW32-40	-	R22-46	K	SSM/S41N
SSG04R125-E4	4	4.5	125	8	55	32	45	3.2	34	0	S32-55	-	R32-55	K	SSM/S41N

(1) When using a drive flange, øDb = 46 mm
(2) When using a drive flange, Max. *ae* = 16 mm
(3) When using a drive flange, Max. *ae* = 26 mm

SPARE PARTS

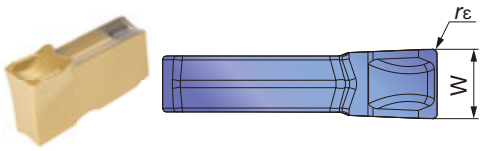
Designation	Extractor
SSG01/02...	ESG 0.5
ASG01/02...	ESG 0.5
SSG03/04...	ESG1

Reference pages

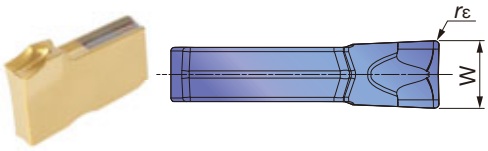
Inserts, Standard cutting conditions → **D173**

INSERT

SSM



SSS



P	Steel	★
M	Stainless	★
K	Cast iron	★
N	Non-ferrous	
S	Superalloys	
H	Hard materials	

★ : First choice
☆ : Second choice

Designation	rε	Coated GH130	W±0.04
SSM22N	0.2	●	2.2
SSM31N	0.2	●	3.1
SSM41N	0.25	●	4.1
SSS16N	0.16	●	1.6
SSS22N	0.2	●	2.2
SSS31N	0.2	●	3.1
SSS41N	0.25	●	4.1

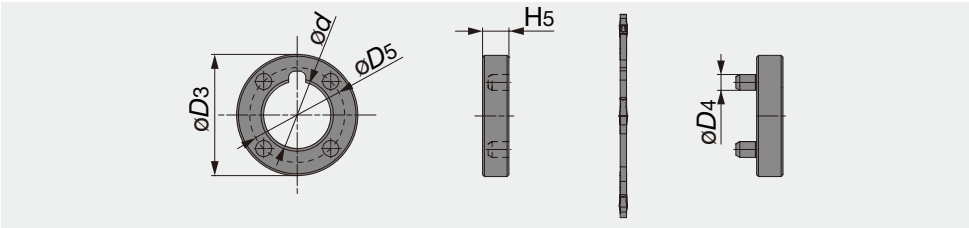
●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Insert	Cutting speed *Vc* (m/min)	Chip thickness t (mm)
P	Low carbon steel E275A, C15E4, etc.	- 200	SSM...	150 - 230	0.05 - 0.15
	High carbon steel E355D, C55, etc.	200 - 300	SSM...	100 - 170	0.04 - 0.13
	Alloy steels 42CrMo4, 20Cr4, etc.	150 - 300	SSM...	90 - 160	0.04 - 0.13
	Tool steel X153CrMoV12, X40CrMoV5-1, etc.	- 300	SSM...	70 - 120	0.04 - 0.13
M	Stainless steel X5CrNi18-9, X5CrNiMo17-12-3, etc.	-	SSS...	90 - 200	0.04 - 0.13
K	Grey cast iron 250, 300, etc.	150 - 250	SSM...	100 - 200	0.05 - 0.15
	Ductile cast iron 400-15S, etc.	150 - 250	SSM...	80 - 130	0.05 - 0.15

R (drive flange set)

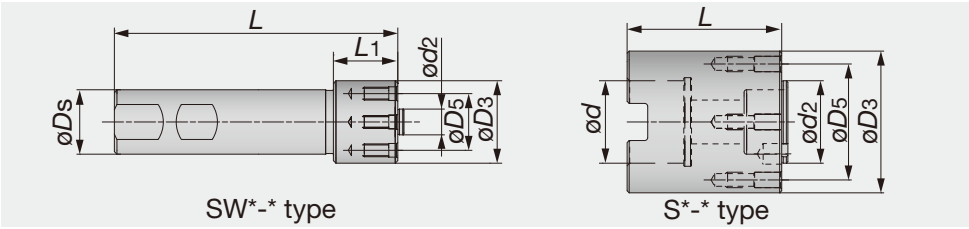
Drive flange set for side cutters



Designation	ød	øD3	øD4	øD5	H5
R22-46	22	46	6	32	10
R32-55	32	55	6	45	10

SW/S

Drive shanks for side cutters



Designation	øDs	ød	ød2	øD3	øD5	L1	L
SW25-32	25	-	10	32	22	25	110
SW32-40	32	-	22	40	32	30	120
SW1.00-32	25.4	-	10	32	22	25.4	110
S32-55	-	32	32	55	45	-	60

SPARE PARTS

Designation	Screw	Wrench		
		Mono block type	Torx bit	Handle
SW25-32	SR76-961	SETT-15/5	-	-
SW32-40	SR76-963	SETT-15/5	-	-
SW1.00-32	SR76-961	SETT-15/5	-	-
S32-55	SR76-943	-	BT20M	H-TB

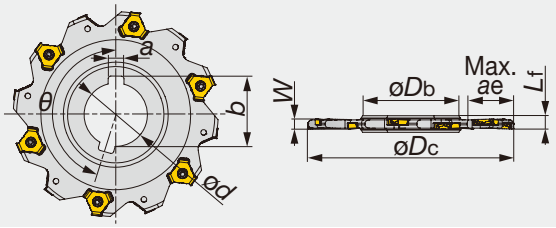
Slot Milling

Reference pages

Inserts, Standard cutting conditions → **D176**

ASV 02/03/04/05

Axial drive type slot milling cutter with tangentially mounted inserts



Designation	W	øDc	Edge/Z	øDb	ød	Lf	b	a	Max. ae	θ°	Insert
ASV02N080-E4	4	80	5/10	41	27	6	29.8	7	15	162	TVKX0202...
ASV02N100-E4	4	100	6/12	47	32	6	34.8	8	20	165	TVKX0202...
ASV02N125-E4	4	125	8/16	55	40	6	43.5	10	30	168.75	TVKX0202...
ASV02N160-E4	4	160	10/20	55	40	6	43.5	10	45	171	TVKX0202...
ASV03N080-E5	5	80	5/10	41	27	6.5	29.8	7	15	162	TVKX03X3...
ASV03N100-E5	5	100	6/12	47	32	6.5	34.8	8	20	165	TVKX03X3...
ASV03N125-E5	5	125	8/16	55	40	6.5	43.5	10	30	168.75	TVKX03X3...
ASV03N160-E5	5	160	10/20	55	40	6.5	43.5	10	45	171	TVKX03X3...
ASV04N080-E6	6	80	4/8	41	27	8	29.8	7	17	157.5	TVKX04H3...
ASV04N100-E6	6	100	5/10	47	32	8	34.8	8	23.5	162	TVKX04H3...
ASV04N125-E6	6	125	6/12	55	40	8	43.5	10	32.5	165	TVKX04H3...
ASV04N160-E6	6	160	8/16	55	40	8	43.5	10	50	168.75	TVKX04H3...
ASV04N200-E6	6	200	10/20	69	50	8	53.5	12	63	171	TVKX04H3...
ASV05N080-E8	8	80	4/8	41	27	10	29.8	7	17	157.5	TVKX0504...
ASV05N100-E8	8	100	5/10	47	32	10	34.8	8	23.5	162	TVKX0504...
ASV05N125-E8	8	125	6/12	55	40	10	43.5	10	32.5	165	TVKX0504...
ASV05N160-E8	8	160	8/16	55	40	10	43.5	10	50	168.75	TVKX0504...
ASV05N200-E8	8	200	10/20	69	50	10	53.5	12	63	171	TVKX0504...

SPARE PARTS

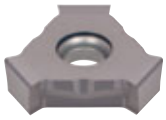
Designation	Clamping screw	Grip	Lubricant	Torx bit	Wrench
ASV02/03N...	SR114-018-L3.40	-	M-1000	-	T-6D
ASV04N...	SR14-500/L5.1	H-TB2W	M-1000	BT15S	-
ASV05N...	SR14-500-L7.0	H-TB2W	M-1000	BT15S	-

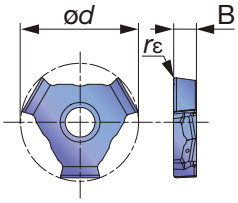
Reference pages

Inserts, Standard cutting conditions → **D176**

INSERT

TVKX-MJ





		AH120	AH130	AH725
P	Steel	☆		★
M	Stainless		★	☆
K	Cast iron	★		☆
N	Non-ferrous			
S	Superalloys	★	☆	★
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	rε	Coated AH120	Coated AH130	Coated AH725	B	ød
TVKX020202TN-MJ	0.2	●		●	2.4	9.4
TVKX020204TN-MJ	0.4	●		●	2.4	9.4
TVKX03X302TN-MJ	0.2	●		●	3.2	9.4
TVKX03X304TN-MJ	0.4	●		●	3.2	9.4
TVKX04H304TN-MJ	0.4	●	●	●	3.5	16.9
TVKX04H308TN-MJ	0.8	●	●	●	3.5	16.9
TVKX050404TN-MJ	0.4	●	●	●	4.5	16.9
TVKX050408TN-MJ	0.8	●	●	●	4.5	16.9

●: Line up

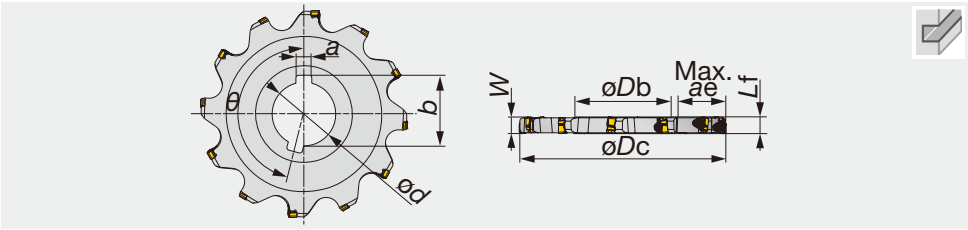
Slot Milling

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Priority	Grade	Cutting speed Vc (m/min)	Feed per edge line: fz (mm/t) ASV ae / øDc (mm) 10%	ASV 20%	ASV 30%	ASV ≤ 50%
P	Low carbon steels E275A, etc.	- 200	First choice	AH725	90 - 180	0.08 - 0.25	0.06 - 0.19	0.05 - 0.16	0.05 - 0.15
		- 200	For impact resistance	AH130	90 - 180	0.08 - 0.25	0.06 - 0.19	0.05 - 0.16	0.05 - 0.15
	High carbon steels C45, etc.	200 - 300	First choice	AH725	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
		200 - 300	For impact resistance	AH130	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
	Alloy steels 42CrMo4, etc.	150 - 300	First choice	AH725	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
		150 - 300	For impact resistance	AH130	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
	Tool steels X40CrMoV5-1, etc.	- 300	First choice	AH725	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
		- 300	For impact resistance	AH130	90 - 180	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
M	Stainless steel X5CrNi18-9, etc.	-	-	AH130	90 - 200	0.07 - 0.22	0.05 - 0.16	0.04 - 0.14	0.04 - 0.13
K	Grey cast irons 250, etc.	150 - 250	-	AH120	120 - 230	0.08 - 0.25	0.06 - 0.19	0.05 - 0.16	0.05 - 0.15
	Ductile cast irons 400-15S, etc.	150 - 250	-	AH120	90 - 150	0.08 - 0.25	0.06 - 0.19	0.05 - 0.16	0.05 - 0.15
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH725	30 - 40	0.07 - 0.12	0.05 - 0.09	0.04 - 0.07	0.04 - 0.07
		-	For impact resistance	AH130	30 - 40	0.07 - 0.12	0.05 - 0.09	0.04 - 0.07	0.04 - 0.07
	Nickel-based alloys Inconel 718, etc.	-	First choice	AH725	20 - 35	0.07 - 0.12	0.05 - 0.09	0.04 - 0.07	0.04 - 0.07
		-	For impact resistance	AH130	20 - 35	0.07 - 0.12	0.05 - 0.09	0.04 - 0.07	0.04 - 0.07

ASW 06/07/09

Axial drive type slot milling cutter



Designation	W	øDc	Edge/Z	øDb	ød	Lf	b	a	Max. ae	θ°	Insert
ASW06N080-E10	10	80	4/8	41	27	10	29.8	7	18.5	157.5	WNGU0603...
ASW06N100-E10	10	100	5/10	47	32	10	34.8	8	25.5	162	WNGU0603...
ASW06N125-E10	10	125	6/12	55	40	10	43.5	10	34	165	WNGU0603...
ASW06N160-E10	10	160	7/14	55	40	10	43.5	10	51.5	167.14	WNGU0603...
ASW07N100-E12	12	100	5/10	47	32	12	34.8	8	25.5	162	WNGU07T3...
ASW07N125-E12	12	125	6/12	55	40	12	43.5	10	34	165	WNGU07T3...
ASW07N160-E12	12	160	7/14	55	40	12	43.5	10	51.5	167.14	WNGU07T3...
ASW09N100-E14	14	100	5/10	47	32	14	34.8	8	25.5	162	WNGU0904...
ASW09N160-E14	14	160	7/14	55	40	14	43.5	10	51.5	167.14	WNGU0904...
ASW09N160-E16	16	160	7/14	55	40	16	43.5	10	51.5	167.14	WNGU0904...

SPARE PARTS

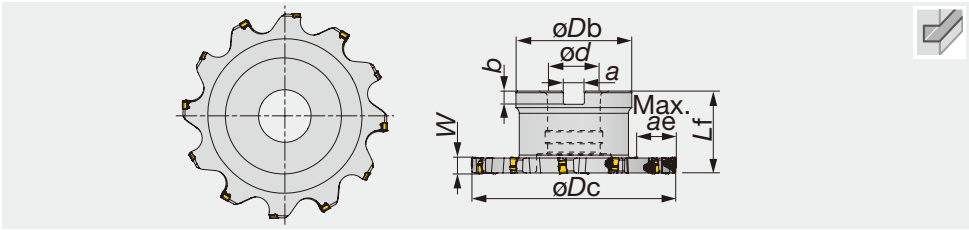
Designation	Clamping screw	Clamping screw 1	Grip	Grip 1	Lubricant	Torx bit	Wrench
ASW06N...	-	CSPB-2.5	-	-	M-1000	-	IP-8D
ASW07N100/125-...	-	CSPD-3	-	SW6-SD	M-1000	BLD IP10/S7	-
ASW07N160-...	-	CSPD-3	-	-	M-1000	-	IP-10D
ASW09N100-...	CSPB-3.5	-	H-TB2W	-	M-1000	BLDIP15/S7	-
ASW09N160-...	CSPB-3.5	-	-	-	M-1000	-	IP-15D

Reference pages

Inserts → **D178**, Standard cutting conditions → **D179**

TSW 06/07/09

Radial drive type slot milling cutter



Designation	W	øDc	Edge/Z	øDb	ød	Lf	b	a	Max. ae	Insert
TSW06R100-E10	10	100	5/10	58	27	50	7	12.4	20	WNGU0603...
TSW06R125-E10	10	125	6/12	66	32	50	8	14.4	28.5	WNGU0603...
TSW06R160-E10	10	160	7/14	82	40	63	9	16.4	38	WNGU0603...
TSW07R100-E12	12	100	5/10	58	27	50	7	12.4	20	WNGU07T3...
TSW07R125-E12	12	125	6/12	66	32	50	8	14.4	28.5	WNGU07T3...
TSW07R160-E12	12	160	7/14	82	40	63	9	16.4	38	WNGU07T3...
TSW09R160-E16	16	160	7/14	82	40	63	9	16.4	38	WNGU0904...

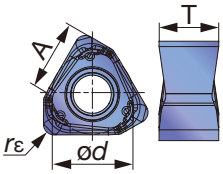
SPARE PARTS

Designation	Clamping screw	Clamping screw 1	Grip	Lubricant	Torx bit	Wrench
TSW06R...	-	CSPB-2.5	-	M-1000	-	IP-8D
TSW07R100/125-...	-	CSPD-3	SW6-SD	M-1000	BLD IP10/S7	-
TSW07R160-...	-	CSPD-3	-	M-1000	-	IP-10D
TSW09R160-...	CSPB-3.5	-	-	M-1000	-	IP-15D

Slot Milling

INSERT

WNGU-MJ



		AH120	AH130	AH725
P	Steel	☆		★
M	Stainless		★	☆
K	Cast iron	★		☆
N	Non-ferrous			
S	Superalloys	★	☆	★
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	rε	Coated AH120	AH130	AH725	A	ød	T
WNGU060308TN-MJ	0.8	●	●	●	5.6	6.1	4.4
WNGU060316TN-MJ	1.6	●	●	●	5.6	6.1	4.4
WNGU07T308TN-MJ	0.8	●	●	●	6.8	7.4	5.5
WNGU07T316TN-MJ	1.6	●	●	●	6.8	7.4	5.5
WNGU090408TN-MJ	0.8	●	●	●	8.5	8.6	6.5
WNGU090416TN-MJ	1.6	●	●	●	8.5	8.6	6.5

●: Line up

Reference pages

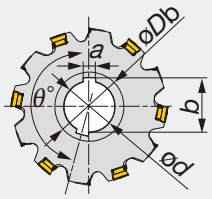
Standard cutting conditions → **D179**

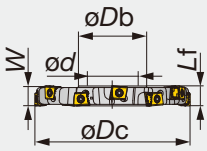
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per edge line: *fz* (mm/t) TSW / ASW ae / ø*Dc* (mm) 10%	20%	30%	≤ 50%
P	Low carbon steels E275A, etc.	- 200	First choice	AH725	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
		- 200	For impact resistance	AH130	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
	High carbon steels C45, etc.	200 - 300	First choice	AH725	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
		200 - 300	For impact resistance	AH130	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
	Alloy steels 42CrMo4, etc.	150 - 300	First choice	AH725	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
		150 - 300	For impact resistance	AH130	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
	Tool steels X40CrMoV5-1, etc.	- 300	First choice	AH725	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
		- 300	For impact resistance	AH130	90 - 180	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
M	Stainless steel X5CrNi18-9, etc.	-	-	AH130	90 - 200	0.12 - 0.33	0.09 - 0.25	0.07 - 0.21	0.07 - 0.2
K	Grey cast irons 250, etc.	150 - 250	-	AH120	120 - 230	0.12 - 0.42	0.09 - 0.31	0.07 - 0.27	0.07 - 0.25
	Ductile cast irons 400-15S, etc.	150 - 250	-	AH120	90 - 150	0.12 - 0.42	0.09 - 0.31	0.07 - 0.27	0.07 - 0.25
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH725	30 - 40	0.1 - 0.17	0.08 - 0.13	0.06 - 0.11	0.06 - 0.1
		-	For impact resistance	AH130	30 - 40	0.1 - 0.17	0.08 - 0.13	0.06 - 0.11	0.06 - 0.1
	Nickel-based alloys Inconel 718, etc.	-	First choice	AH725	20 - 35	0.1 - 0.17	0.08 - 0.13	0.06 - 0.11	0.06 - 0.1
		-	For impact resistance	AH130	20 - 35	0.1 - 0.17	0.08 - 0.13	0.06 - 0.11	0.06 - 0.1

ASN 10/12/15

Axial drive type slot milling cutter with tangentially mounted inserts





Designation	W	øDc	Z eff	z	øDb	ød	Lf	b	a	Max. ae	θ°	Insert
ASN10R100M32.0E16-05	16	100	5	10	47	32	16	34.8	8	25.5	162	LMEU1008**ZNEN-MJ
ASN10R125M40.0E16-06	16	125	6	12	55	40	16	43.5	10	34	165	LMEU1008**ZNEN-MJ
ASN10R160M40.0E16-07	16	160	7	14	55	40	16	43.5	10	51.5	167.14	LMEU1008**ZNEN-MJ
ASN10R200M50.0E16-08	16	200	8	16	69	50	16	53.6	12	64.5	168.75	LMEU1008**ZNEN-MJ
ASN12R100M32.0E19-05	19	100	5	10	47	32	19	34.8	8	25.5	162	LMEU1208**ZNEN-MJ
ASN12R125M40.0E19-06	19	125	6	12	55	40	19	43.5	10	34	165	LMEU1208**ZNEN-MJ
ASN12R160M40.0E19-07	19	160	7	14	55	40	19	43.5	10	51.5	167.14	LMEU1208**ZNEN-MJ
ASN12R200M50.0E19-08	19	200	8	16	69	50	19	53.6	12	64.5	168.75	LMEU1208**ZNEN-MJ
ASN12R250M50.0E19-09	19	250	9	18	84	50	19	53.6	12	82	170	LMEU1208**ZNEN-MJ
ASN15R125M40.0E25-05	25	125	5	10	55	40	25	43.5	10	34	165	LMEU1509**ZNEN-MJ
ASN15R160M40.0E25-06	25	160	6	12	55	40	25	43.5	10	51.5	167.14	LMEU1509**ZNEN-MJ
ASN15R200M50.0E25-07	25	200	7	14	69	50	25	53.6	12	64.5	168.75	LMEU1509**ZNEN-MJ
ASN15R250M50.0E25-08	25	250	8	16	84	50	25	53.6	12	82	170	LMEU1509**ZNEN-MJ

SPARE PARTS

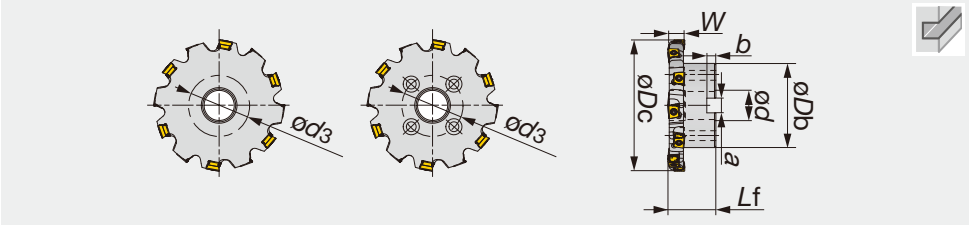
Designation	Clamping screw	Grip	Torx bit
ASN10/12R...	SM40-143-H0	H-TB	BT15S
ASN15R...	CSTB-5L159	H-TB	BT20S

Reference pages

Inserts, Standard cutting conditions → **D182**

TSN

Radial drive type slot milling cutter with tangentially mounted inserts



Designation	W	øDc	Z eff	z	øDb	ød	Lf	b	a	Max. ae	ød3	Insert
TSN10R100M27.0E16-05	16	100	5	10	58	27	50	7	12.4	20	-	LMEU1008**ZNEN-MJ
TSN10R125M32.0E16-06	16	125	6	12	66	32	50	8	14.4	28.5	-	LMEU1008**ZNEN-MJ
TSN10R160M40.0E16-07	16	160	7	14	82	40	63	9	16.4	38	-	LMEU1008**ZNEN-MJ
TSN10R200M40.0E16-08	16	200	8	16	95	40	63	9	16.4	55	66.7	LMEU1008**ZNEN-MJ
TSN12R100M27.0E19-05	19	100	5	10	58	27	50	7	12.4	20	-	LMEU1208**ZNEN-MJ
TSN12R125M32.0E19-06	19	125	6	12	66	32	50	8	14.4	28.5	-	LMEU1208**ZNEN-MJ
TSN12R160M40.0E19-07	19	160	7	14	82	40	63	9	16.4	38	-	LMEU1208**ZNEN-MJ
TSN12R200M40.0E19-08	19	200	8	16	95	40	63	9	16.4	55	66.7	LMEU1208**ZNEN-MJ
TSN12R250M60.0E19-09	19	250	9	18	135	60	63	14	25.7	60	101.6	LMEU1208**ZNEN-MJ
TSN15R125M32.0E25-05	25	125	5	10	66	32	50	8	14.4	28.5	-	LMEU1509**ZNEN-MJ
TSN15R160M40.0E25-06	25	160	6	12	82	40	63	9	16.4	38	-	LMEU1509**ZNEN-MJ
TSN15R200M40.0E25-07	25	200	7	14	95	40	63	9	16.4	55	66.7	LMEU1509**ZNEN-MJ
TSN15R250M60.0E25-08	25	250	8	16	135	60	63	14	25.7	60	101.6	LMEU1509**ZNEN-MJ

SPARE PARTS

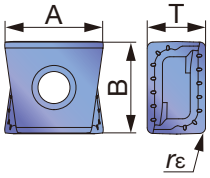
Designation	Clamping screw	Grip	Torx bit
TSN10/12R...	SM40-143-H0	H-TB	BT15S
TSN15R...	CSTB-5L159	H-TB	BT20S

Reference pages

Inserts, Standard cutting conditions → **D182**

INSERT

LMEU-MJ



P	Steel	☆		★	
M	Stainless		★	☆	
K	Cast iron	★		☆	
N	Non-ferrous				
S	Superalloys	☆		★	
H	Hard materials				

★ : First choice
☆ : Second choice

Designation	rε	Coated AH120	Coated AH140	Coated AH725	A	B	T
LMEU100808ZNEN-MJ	0.8	●	●	●	12.7	10.5	8
LMEU100816ZNEN-MJ	1.6	●	●	●	12.5	10.5	8
LMEU100824ZNEN-MJ	2.4	●	●	●	12.4	10.5	8
LMEU100832ZNEN-MJ	3.2	●	●	●	12.2	10.5	8
LMEU120808ZNEN-MJ	0.8	●	●	●	13.6	12.7	8
LMEU120816ZNEN-MJ	1.6	●	●	●	13.4	12.7	8
LMEU120824ZNEN-MJ	2.4	●	●	●	13.2	12.7	8
LMEU120832ZNEN-MJ	3.2	●	●	●	13.1	12.7	8
LMEU150908ZNEN-MJ	0.8	●	●	●	15.6	15	9.5
LMEU150916ZNEN-MJ	1.6	●	●	●	15.4	15	9.5
LMEU150924ZNEN-MJ	2.4	●	●	●	15.3	15	9.5
LMEU150932ZNEN-MJ	3.2	●	●	●	15.1	15	9.5

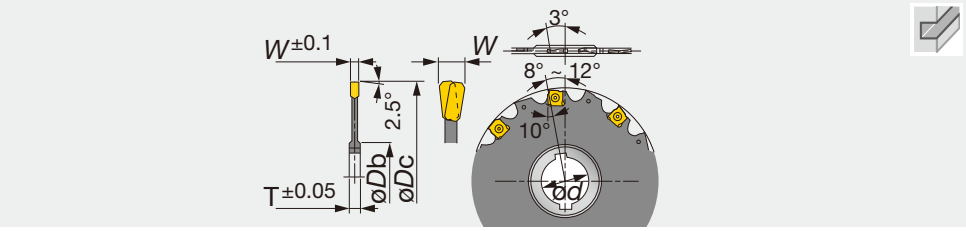
●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness (HB)	Priority	Grade	Cutting speed *Vc* (m/min)	Feed per edge line: *fz* (mm/t) TSN / ASN ae / ø*Dc* (mm) 10%	20%	30%	≤ 50%
P	Low carbon steels E275A, etc.	- 200	First choice	AH725	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
		- 200	For impact resistance	AH140	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
	High carbon steels C45, etc.	200 - 300	First choice	AH725	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
		200 - 300	For impact resistance	AH140	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
	Alloy steels 42CrMo4, etc.	150 - 300	First choice	AH725	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
		150 - 300	For impact resistance	AH140	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
	Tool steels X40CrMoV5-1, etc.	- 300	First choice	AH725	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
		- 300	For impact resistance	AH140	90 - 180	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
M	Stainless steel X5CrNi18-9, etc.	-	-	AH140	90 - 200	0.22 - 0.42	0.16 - 0.31	0.14 - 0.27	0.13 - 0.25
K	Grey cast irons 250, etc.	150 - 250	-	AH120	120 - 230	0.22 - 0.5	0.16 - 0.38	0.14 - 0.32	0.13 - 0.3
	Ductile cast irons 400-15S, etc.	150 - 250	-	AH120	90 - 150	0.22 - 0.33	0.16 - 0.25	0.14 - 0.21	0.13 - 0.2
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH725	30 - 40	0.12 - 0.22	0.09 - 0.16	0.07 - 0.14	0.07 - 0.13
	Nickel-based alloys Inconel 718, etc.	-	First choice	AH725	20 - 35	0.12 - 0.22	0.09 - 0.16	0.07 - 0.14	0.07 - 0.13

SVN4000

Indexable side slotting cutter for 5 - 8 mm width



Designation	øDc	W	Edge/z	ød	øDb	T	Insert
SVN4100-5M	100	5	2/10	32	48	8	SNEN12T2...
SVN4100-6M	100	6	2/10	32	48	10	SNEN1233...
SVN4100-8M	100	8	4/8	32	48	12	SNEN1233...
SVN4125-5M	125	5	2/12	32	48	8	SNEN12T2...
SVN4125-6M	125	6	2/12	32	48	10	SNEN1233...
SVN4125-8M	125	8	4/12	32	48	12	SNEN1233...
SVN4160-5M	160	5	2/16	40	58	8	SNEN12T2...
SVN4160-6M	160	6	2/16	40	58	10	SNEN1233...
SVN4160-8M	160	8	4/16	40	58	12	SNEN1233...
SVN4200-5M	200	5	2/20	40	68	8	SNEN12T2...
SVN4200-6M	200	6	2/20	40	68	10	SNEN1233...
SVN4200-8M	200	8	4/20	40	68	12	SNEN1233...

SPARE PARTS

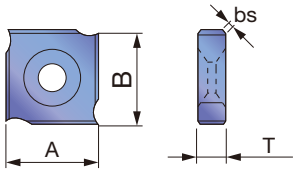
Designation	Clamping screw	Wrench
SVN4100-5M	CST-3.5S	T-9D
SVN4100-6/8M	CST-3.5	T-9D
SVN4125-5M	CST-3.5S	T-9D
SVN4125-6/8M	CST-3.5	T-9D
SVN4160-5M	CST-3.5S	T-9D
SVN4160-6/8M	CST-3.5	T-9D
SVN4200-5M	CST-3.5S	T-9D
SVN4200-6/8M	CST-3.5	T-9D

● Notes on specifications of specials made to order

① The cutter widths (ℓ) are available in a range from 5 mm to 12 mm.
② The maximum cutter diameter available is ø960 mm.
③ Special mounting specifications are also available on request.

INSERT

SNEN12



		Uncoated	
		UX30	TH10
P	Steel	★	
M	Stainless		
K	Cast iron		★
N	Non-ferrous		★
S	Superalloys		
H	Hard materials		

★ : First choice
☆ : Second choice

Designation	UX30	TH10	A	B	T	bs	Honing
SNEN12T2ZFN		●	12.7	12.7	2.8	0.15	without
SNEN12T2ZTN	●		12.7	12.7	2.8	0.15	with
SNEN1233ZFN		●	12.7	12.7	3.3	0.15	without
SNEN1233ZTN	●		12.7	12.7	3.3	0.15	with

●: Line up

Reference pages

Standard cutting conditions → **D184**

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)
P	Carbon steels < 300 HB	UX30	80 ~ 120
	Die steels < 300 HB	UX30	60 ~ 80
K	Cast irons	TH10	80 ~ 100
N	Aluminium alloys	TH10	600 ~ 1000

Note: SVN4000 type TAC mills should be used only for roughing. Attainable accuracy of groove width is ±0.1 mm.

- No. of revolutions n (min^{-1}) = Cutting speed Vc (m/min) × 1000 ÷ 3.14 ÷ Cutter ø (mm)
- Feed speed Vf (mm/min) = n (min^{-1}) × Feed per tooth fz (mm/t) × z (No. of inserts)

MEMO

MillLine - Profile Milling

DOTWISTBALL

D016

Radius cutters with double-sided inserts with rigid clamping

ø20 - ø50 mm
max. ap 4 mm

P M K S H

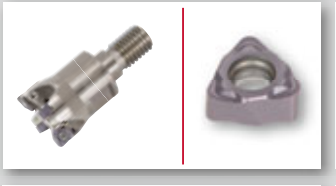
BALL FINISHNOSE

D188

Indexable endmill for high-precision finishing with 2 effective cutting edges

ø8 - ø32 mm

P M K N H



DOMINIMILL

D193

Double-sided positive inserts for finishing to semi-finishing in profiling operations

ø16 - ø25 mm
max. ap 1 mm

P H

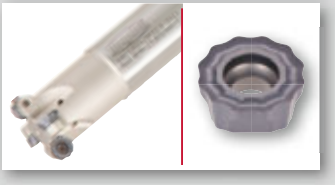
FIXRMILL

D194

Radius cutters with single-sided inserts for profile milling of complex parts

ø20 - ø66 mm
max. ap 8 mm

P M K H



ROUNDSPLIT

D199

Radius cutters featuring single-sided inserts with serrated cutting edges for anti-chatter

ø32 - ø125 mm
max. ap 8 mm

P M K N S

Other radius mills

D204

T/ERD12/16, E/HWD

P M K H

Single Effective Tools - Ball Cutters

D210

TBN1000, EBP, EBB, EBD, BBB

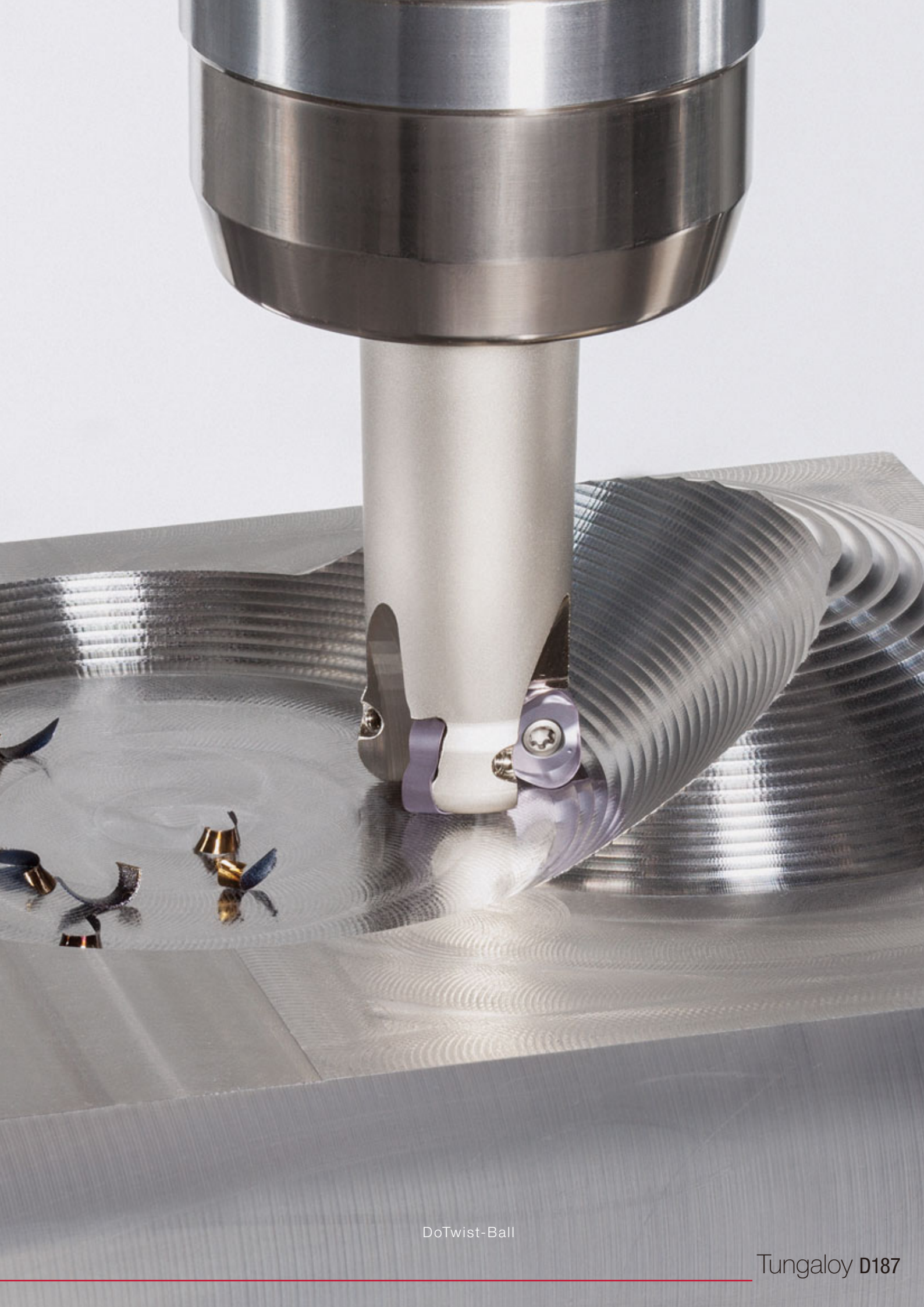
P K H

Z-FEEDMILL

D218

Z-direction plunging tools for high metal removal

P K H



DoTwist-Ball

EBFM

Indexable endmills for high precision finish

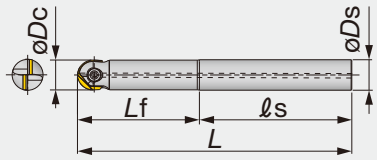


Fig. 1

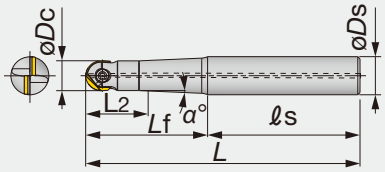
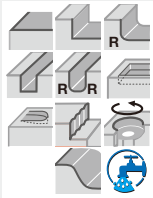


Fig. 2



Designation	Material	øDc	øDs	ℓs	Lf	L	L2	α°	Air hole	Fig	Insert
EBFM08T12S100	Steel	8	12	80	20	100	10	9.5	with	2	ZF*M080...
EBFM08S08C100	Carbide	8	8	70	30	100	-	-	without	1	ZF*M080...
EBFM08S08C140	Carbide	8	8	75	65	140	-	-	without	1	ZF*M080...
EBFM10T12S100	Steel	10	12	75	25	100	15	5	with	2	ZF*M100...
EBFM10S10C140	Carbide	10	10	65	75	140	-	-	without	1	ZF*M100...
EBFM10S10C220	Carbide	10	10	80	140	220	-	-	without	1	ZF*M100...
EBFM12S12S110	Steel	12	12	80	30	110	-	-	with	1	ZF*M120...
EBFM12S12C160	Carbide	12	12	70	90	160	-	-	without	1	ZF*M120...
EBFM12S12C220	Carbide	12	12	70	150	220	-	-	without	1	ZF*M120...
EBFM16T20S130	Steel	16	20	80	50	130	15.5	1.5	with	2	ZF*M160...
EBFM16S16C160	Carbide	16	16	80	80	160	-	-	without	1	ZF*M160...
EBFM16S16C220	Carbide	16	16	70	150	220	-	-	without	1	ZF*M160...
EBFM20T25S180	Steel	20	25	100	80	180	24	2.5	with	2	ZF*M200...
EBFM20S20C220	Carbide	20	20	100	120	220	-	-	without	1	ZF*M200...
EBFM20S20C300	Carbide	20	20	80	220	300	-	-	without	1	ZF*M200...
EBFM25T32S200	Steel	25	32	100	100	200	32	1.5	with	2	ZF*M250...
EBFM25S25C220	Carbide	25	25	100	120	220	-	-	without	1	ZF*M250...
EBFM25S25C300	Carbide	25	25	80	220	300	-	-	without	1	ZF*M250...
EBFM30T32S220	Steel	30	32	120	100	220	35	0.5	with	2	ZF*M300...
EBFM30S32C250	Carbide	30	32	100	150	250	-	-	without	1	ZF*M300...
EBFM30S32C350	Carbide	30	32	100	250	350	-	-	without	1	ZF*M300...
EBFM32S32S250	Steel	32	32	150	100	250	-	-	with	1	ZF*M320...
EBFM32S32C300	Carbide	32	32	80	220	300	-	-	without	1	ZF*M320...

SPARE PARTS

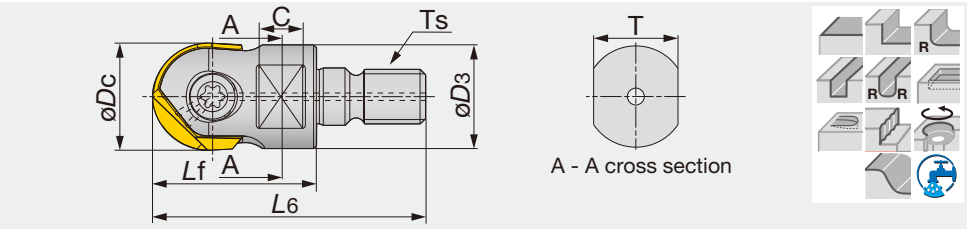
Designation	Clamping screw	Torx bit	Grip	Wrench
EBFM08...	TS 25F080A	-	-	T-8D
EBFM10...	TS 30F100A	-	-	T-10D
EBFM12...	TS 40F120A	-	-	T-15D
EBFM16...	TS 50F160A	BT20S	H-TB2W	-
EBFM20...	TS 60F200A	BLDT25/M7	H-TB2W	-
EBFM25...	TS 70F250A	BLDT25/M7	H-TB2W	-
EBFM30...	TS 80F300A	-	-	T-T30
EBFM32...	TS 80F300A	-	-	T-T30

Reference pages

Inserts → **D190**, Standard cutting conditions → **D191**

HBFM

Indexable endmills with TungFlex thread connection for high precision finish



Designation	øDc	L6	Lf	C	T	øD3	Ts	Air hole	Insert
HBFM10M06	10	34.5	20	5	7	9.7	M6	with	ZF*M100...
HBFM12M06	12	37.5	23	5	7	11.5	M6	with	ZF*M120...
HBFM12M08	12	40	23	8	10	13	M8	with	ZF*M120...
HBFM16M08	16	47	30	8	10	13	M8	with	ZF*M160...
HBFM20M10	20	49	30	10	15	19	M10	with	ZF*M200...
HBFM25M12	25	57	35	10	17	24	M12	with	ZF*M250...
HBFM30M16	30	66	43	12	22	29	M16	with	ZF*M300...
HBFM32M16	32	66	43	12	22	29.5	M16	with	ZF*M320...

See page **D192** for TungFlex modular shank.

SPARE PARTS

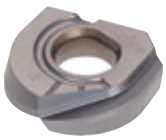
Designation	Clamping screw	Torx bit	Grip	Wrench
HBFM10...	TS 30F100A	-	-	T-10D
HBFM12...	TS 40F120A	-	-	T-15D
HBFM16...	TS 50F160A	BT20S	H-TB2W	-
HBFM20...	TS 60F200A	BLDT25/M7	H-TB2W	-
HBFM25...	TS 70F250A	BLDT25/M7	H-TB2W	-
HBFM30...	TS 80F300A	-	-	T-T30
HBFM32...	TS 80F300A	-	-	T-T30

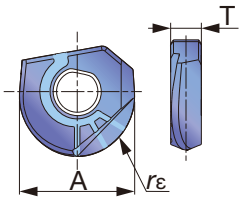
Reference pages

Inserts → **D190**, Standard cutting conditions → **D191**

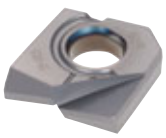
INSERT

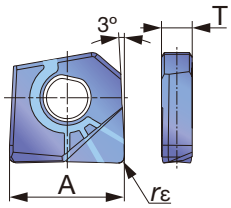
ZFBM-MJ





ZFRM-MJ





P	Steel	☆	★
M	Stainless		☆
K	Cast iron	★	☆
N	Non-ferrous		☆
S	Superalloys		★
H	Hard materials	★	☆

★ : First choice
☆ : Second choice

Designation	rε	Coated		A	T
		AH710	AH725		
ZFBM080R00-MJ	4	●	●	8	2.4
ZFBM100R00-MJ	5	●	●	10	2.9
ZFBM120R00-MJ	6	●	●	12	3.4
ZFBM160R00-MJ	8	●	●	16	4.4
ZFBM200R00-MJ	10	●	●	20	5.4
ZFBM250R00-MJ	12.5	●	●	25	6.4
ZFBM300R00-MJ	15	●	●	30	7.4
ZFBM320R00-MJ	16	●	●	32	7.4
ZFRM120R05-MJ	0.5	●	●	12	3.4
ZFRM120R10-MJ	1	●	●	12	3.4
ZFRM160R05-MJ	0.5	●	●	16	4.4
ZFRM160R10-MJ	1	●	●	16	4.4
ZFRM160R15-MJ	1.5	●	●	16	4.4
ZFRM200R10-MJ	1	●	●	20	5.4
ZFRM200R15-MJ	1.5	●	●	20	5.4

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grade	Max. depth of cut	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t)							
							D8	D10	D12	D16	D20	D25	D30	D32
P	Low carbon steel, alloy steel	85 - 180 HB	First choice	AH725	≤ 0.04D	180 - 260	0.15	0.2	0.2	0.25	0.25	0.3	0.35	0.35
		85 - 180 HB	For wear resistance	AH710	≤ 0.04D	180 - 260	0.15	0.2	0.2	0.25	0.25	0.3	0.35	0.35
	High carbon steel, alloy steel	180 - 280 HB	First choice	AH725	≤ 0.03D	150 - 230	0.15	0.2	0.2	0.25	0.25	0.3	0.35	0.35
		180 - 280 HB	For wear resistance	AH710	≤ 0.03D	180 - 230	0.15	0.2	0.2	0.25	0.25	0.3	0.35	0.35
	Prehardened steel Die & mold tool steel	40 - 48 HRC	First choice	AH710	≤ 0.03D	180 - 300	0.15	0.15	0.2	0.2	0.25	0.25	0.3	0.3
		40 - 48 HRC	For fracture resistance	AH725	≤ 0.03D	180 - 300	0.15	0.15	0.2	0.2	0.25	0.25	0.3	0.3
M	Stainless steel	135 - 200 HB	First choice	AH725	≤ 0.03D	100 - 250	0.1	0.15	0.2	0.2	0.25	0.25	0.3	0.3
K	Cast iron	150 - 240 HB	First choice	AH710	≤ 0.04D	90 - 350	0.2	0.2	0.25	0.3	0.3	0.35	0.4	0.4
		150 - 240 HB	For fracture resistance	AH725	≤ 0.04D	90 - 350	0.2	0.2	0.25	0.3	0.3	0.35	0.4	0.4
N	Aluminium	-	First choice	AH725	≤ 0.03D	200 - 400	0.25	0.25	0.35	0.35	0.35	0.4	0.4	0.45
S	Titanium alloys	-	First choice	AH725	≤ 0.03D	30 - 80	0.08	0.08	0.1	0.12	0.15	0.18	0.2	0.2
	Heat-resistant alloys	-	First choice	AH725	≤ 0.03D	30 - 100	0.08	0.08	0.1	0.12	0.15	0.18	0.2	0.2
H	High hardened steel	48 - 65 HRC	First choice	AH710	≤ 0.02D	100 - 350	0.08	0.08	0.1	0.13	0.15	0.2	0.2	0.25

· Remove excessive chip accumulation with an air blast.
· For the operation with depth of cut which varies (ex.casting skin) and machining of workpiece materials with interrupted surface, the feed per tooth (*fz*) should be set to the lower recommended value shown in the above table.
· Cutting conditions maybe limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

How to clamp the insert

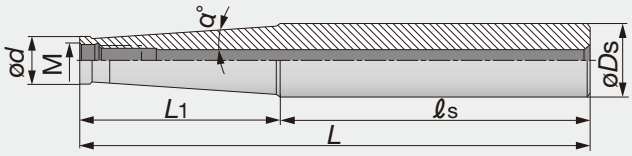
1. Clear chips and dust from the pocket.
2. Place the insert in the pocket. The insert can be placed only in one direction.
3. Tighten the screw while pressing the insert into the pocket.

How to check the run-out

1. Clamp the insert on the shank.
2. Clamp the shank on a high-precision arbor.
3. Measure the run-out on tool presetter or by dial gauge.

Notes:
1. Due to the helical cutting edge, it is important that the run-out is inspected with the insert clamped on the shank.
2. Do not use micrometer or caliper to inspect the insert diameter as inaccurate dimensions may be provided.

TungFlex - Modular shank



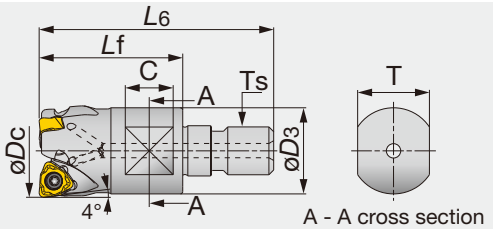
Designation	øDs	L	ℓs	L1	ød	M	α°	Shank type
SM06-L60C10	10	60	40	20	9.7	M6	0	Cylindrical
SM06-L105-C12	12	105	45	60	9.7	M6	1.2	Cylindrical
SM06-L125-C16	16	125	65	60	9.7	M6	3.3	Cylindrical
SM08-L73C16	16	73	48	25	13	M8	0	Cylindrical
SM08-L128-C16	16	128	48	80	13	M8	0.9	Cylindrical
SM08-L170-C20	20	170	103.2	66.8	13	M8	3.3	Cylindrical
SM10-L80-C20	20	80	50	30	18	M10	0	Cylindrical
SM10-L130-C20	20	130	50	80	18	M10	0.6	Cylindrical
SM10-L200-C25	25	200	142.8	57.2	19	M10	3.3	Cylindrical
SM12-L86-C25	25	86	56	30	21	M12	5.1	Cylindrical
SM12-L200-C32	32	200	122	78	21	M12	4.4	Cylindrical
SM16-L95-C32	32	95	60	35	29	M16	1.7	Cylindrical
SM16-L230-C32	32	230	180	50	29	M16	1.8	Cylindrical

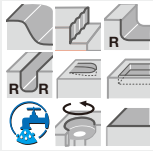
DOMIN MILL

HFWX04-M

Small-radius cutter for finishing operation; Modular head with TungFlex thread connection

A.R. = 0°, R.R. = -14°





Designation	øDc	z	L6	Lf	C	T	øD3	Ts	Kg	Air hole	Insert
HFWX04M016M08R02	16	2	42	25	8	10	13	M8	0.03	with	WXHU04...
HFWX04M020M10R03	20	3	49	30	10	15	18	M10	0.05	with	WXHU04...
HFWX04M025M12R04	25	4	52	30	10	17	21	M12	0.09	with	WXHU04...

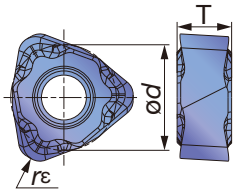
See page **D192** for TungFlex modular shank.

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
HFWX04M...	SR34-514	M-1000	T-7F

INSERT

WXHU-MJ



P	Steel	★
M	Stainless	
K	Cast iron	
N	Non-ferrous	
S	Superalloys	
H	Hard materials	★

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH110	ød	T
WXHU040305R-MJ	0.5	0.5	●	6.35	3.18
WXHU040310R-MJ	1	1	●	6.35	3.18

* For plunging, width up to 2 mm is possible.

●: Line up

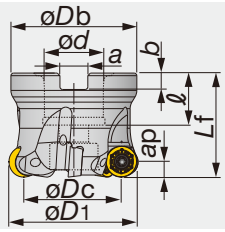
STANDARD CUTTING CONDITIONS

ISO	Workpiece material		Hardness	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	High carbon steel C45, C55, etc.		200 - 300 HB	AH110	100 - 300	0.1 - 0.3
P	Alloy steel 42CrMo4, SCr145, etc.		150 - 300 HB	AH110	100 - 300	0.1 - 0.3
P	Prehardened steel NAK80, PX5, etc.		30 - 40 HRC	AH110	100 - 300	0.05 - 0.3
H	Hardened steel	X40CrMoV5-1, etc.	40 - 50 HRC	AH110	80 - 130	0.1 - 0.3
H	Hardened steel	X153CrMoV12, etc.	50 - 60 HRC	AH110	50 - 100	0.05 - 0.15

FIXRMILL
TRP10/12/16

Radius cutter series bore type with anti-rotation system

A.R. = +4°, R.R. = -4°



Designation	Max. ap	øDc	z	øD1	øDb	ød	ℓ	Lf	b	a	Kg	Air hole	Insert
TRP10R040M16.0E05	5	30	5	40	35	16	18	40	5.6	8.4	0.2	with	RPMT10T3...
TRP12R050M22.0E05	6	38	5	50	47	22	20	40	6.3	10.4	0.3	with	RPMT1204...
TRP12R052M22.0E05	6	40	5	52	49	22	20	40	6.3	10.4	0.3	with	RPMT1204...
TRP12R063M22.0E06	6	51	6	63	59	22	20	40	6.3	10.4	0.6	with	RPMT1204...
TRP12R066M27.0E06	6	54	6	66	62	27	22	40	7	12.4	0.6	with	RPMT1204...
TRP16R063M22.0E05	8	47	5	63	59	22	20	40	6.3	10.4	0.6	with	RPMT1606...
TRP16R066M27.0E05	8	50	5	66	62	27	22	40	7	12.4	0.7	with	RPMT1606...

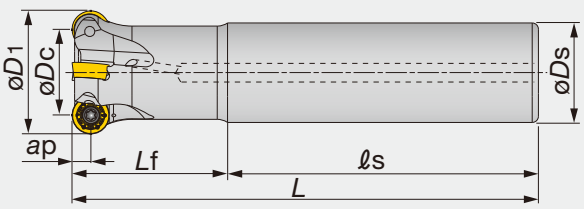
SPARE PARTS

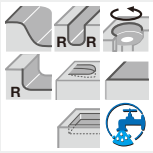
Designation	Clamping screw	Grip	Lubricant	Center bolt	Torx bit
TRP10R040M16.0E05	CSPB-3.5S	H-TBS	M-1000	FSHM8-30H	BLDIP15/S7
TRP12R050 - 063M22.0...	CSTR-4L100	H-TBS	M-1000	CM10X30H	BT15S
TRP12R066M27.0E06	CSTR-4L100	H-TBS	M-1000	CM12X30H	BT15S
TRP16R063M22.0E05	CSPB-5	H-TBS	M-1000	CM10X30H	BLDIP20/S7
TRP16R066M27.0E05	CSPB-5	H-TBS	M-1000	CM12X30H	BLDIP20/S7

FIXRMILL
ERP10/12/16

Radius cutter series shank type with anti-rotation system

A.R. = +10°~ +4°, R.R. = -2°~ -8.5°





Designation	Max. ap	øDc	z	øD1	øDs	ℓs	Lf	L	Air hole	Insert
ERP10R020M20.0-02	5	10	2	20	20	100	50	150	with	RPMT10T3...
ERP10R025M25.0-02	5	15	2	25	25	90	60	150	with	RPMT10T3...
ERP10R032M32.0-04	5	22	4	32	32	80	70	150	with	RPMT10T3...
ERP10R035M32.0-04	5	25	4	35	32	100	50	150	with	RPMT10T3...
ERP12R032M32.0-03	6	20	3	32	32	100	50	150	with	RPMT1204...
ERP12R040M32.0-04	6	28	4	40	32	100	50	150	with	RPMT1204...
ERP16R040M32.0-02	8	24	2	40	32	100	50	150	with	RPMT1606...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
ERP10R...	CSPB-3.5S	M-1000	IP-15D
ERP12R...	CSTR-4L100	M-1000	T-15DB
ERP16R...	CSPB-5	M-1000	IP-20D

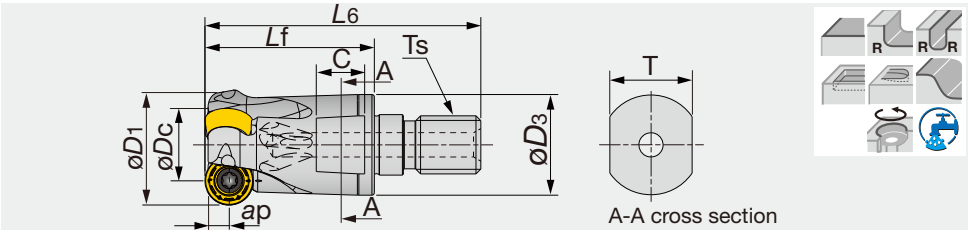
Reference pages

Inserts → **D195**, Standard cutting conditions → **D196 - D197**

FIXRMILL
HRP-M

Radius cutter series modular type (TungFlex) with anti-rotation system

A.R. = 1°~ 4°, R.R. = -8.5°~ 2°



Designation	Max. ap	øDc	z	øD1	L6	Lf	C	T	øD3	Ts	Kg	Air hole	Insert
HRP10R020MM10-02	5	10	2	20	49	30	10	15	17.8	M10	0.1	with	RPMT10T3...
HRP10R025MM12-02	5	15	2	25	57	35	10	17	20.8	M12	0.1	with	RPMT10T3...
HRP10R032MM16-04	5	22	4	32	63	40	12	22	28.8	M16	0.2	with	RPMT10T3...
HRP12R032MM16-03	6	20	3	32	63	40	12	22	28.8	M16	0.2	with	RPMT1204...

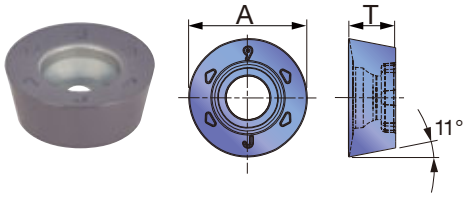
See page **D192** for TungFlex modular shank.

SPARE PARTS

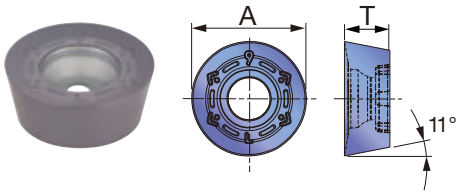
Designation	Clamping screw	Lubricant	Wrench	
			Bit	Grip
HRP10R...	CSPB-3.5S	M-1000	BLD IP15/S7	H-TBS
HRP12R...	CSTR-4L100	M-1000	BT15S	H-TBS

INSERT

RPMT-MJ



RPMT-ML



P	Steel		★	
M	Stainless	★	☆	★
K	Cast iron		☆	
N	Non-ferrous			
S	Superalloys	☆	★	
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	Max. ap	Coated			A	T
		AH130	AH725	AH4035		
RPMT10T3EN-MJ	5	●	●	●	10	3.97
RPMT10T3EN-ML	5	●	●	●	10	3.97
RPMT1204EN-MJ	6	●	●	●	12	4.76
RPMT1204EN-ML	6	●	●	●	12	4.76
RPMT1606EN-MJ	8	●	●	●	16	6.35
RPMT1606EN-ML	8	●	●	●	16	6.35

●: Line up

Profile Milling

Reference pages

Standard cutting conditions → **D196 - D197**

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels C45, C55, etc.	< 300 HB	First choice	AH725	MJ	120 - 250	0.3 - 0.7
		< 300 HB	for impact resistance	AH130	MJ	120 - 250	0.3 - 0.7
	Alloy steels 42CrMo4, 17Cr3, etc.	150 - 300 HB	First choice	AH725	MJ	100 - 250	0.2 - 0.6
		150 - 300 HB	for impact resistance	AH130	MJ	100 - 250	0.2 - 0.6
	Tool steels X153CrMoV12, etc.	< 300 HB		AH725	ML	80 - 180	0.2 - 0.4
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-3, etc.	< 200 HB	First choice	AH130	ML	100 - 250	0.2 - 0.6
		< 200 HB	for impact resistance	AH130	MJ	100 - 250	0.2 - 0.6
	Stainless steels X6Cr17, etc.	< 200 HB	First choice	AH4035	ML	100 - 300	0.2 - 0.6
		< 200 HB	for impact resistance	AH4035	MJ	100 - 300	0.2 - 0.6
K	Grey cast irons 250, etc.	150 - 250 HB	-	AH725	ML	120 - 250	0.3 - 0.7
	Ductile cast irons 400-15S, etc.	150 - 250 HB	-	AH725	ML	100 - 200	0.3 - 0.7
H	Hardened steels X40CrMoV5-1, etc.	40 - 50 HRC	-	AH725	MJ	60 - 140	0.1 - 0.3
	Hardened steels X153CrMoV12, etc.	50 - 60 HRC	-	AH725	MJ	20 - 60	0.05 - 0.2

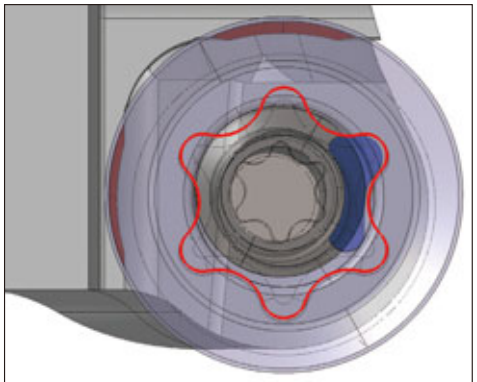
· Use air blast to remove chips from the work area in slot milling or pocketing operation.
· When machining at high cutting speeds of more than *Vc* = 1000 m/min, the dynamic balance of the tools must be adjusted.
· Cutting conditions are limited by machine power, workpiece rigidity and spindle output. When the cutting width or depth is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

Tool dia.: ø*Dc* (mm), Number of revolutions: *n* (min^{-1}), Feed speed: *Vf* (mm/min), Depth of cut: *ap* = 2.0 mm

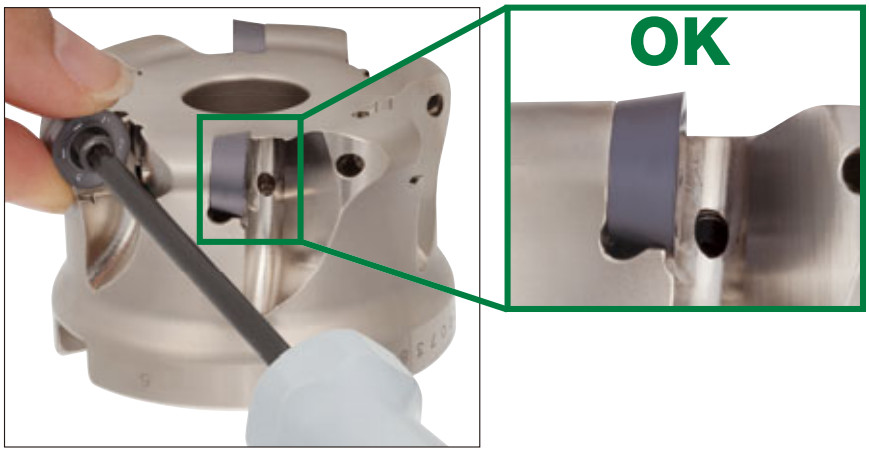
ø20		ø25		ø32			ø35		ø40				ø50		ø63		
n	*Vf*	*n*	*Vf*	*n*	*Vf*		*n*	*Vf*	*n*	*Vf*			*n*	*Vf*	*n*	*Vf*	
	E/HRP10		E/HRP10, E/HRP12		E/HRP10	E/HRP12		ERP10		TRP10	ERP12	ERP16		ERP12		TRP12	TRP16
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, *fz* = 0.5 mm/t																	
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, *fz* = 0.5 mm/t																	
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, *fz* = 0.4 mm/t																	
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, *fz* = 0.4 mm/t																	
2070	1240	1660	1000	1290	1550	1160	1180	1420	1030	1550	1240	620	830	1250	660	1190	990
Vc = 130 m/min, *fz* = 0.3 mm/t																	
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, *fz* = 0.4 mm/t																	
2710	2160	2170	1740	1690	2700	2030	1550	2480	1350	2700	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, *fz* = 0.4 mm/t																	
3180	2540	2550	2040	1990	3180	2390	1820	2910	1590	3180	2540	1270	1270	2540	1010	2420	2020
Vc = 200 m/min, *fz* = 0.4 mm/t																	
3180	2540	2550	2040	1990	3180	2390	1820	2910	1590	3180	2540	1270	1270	2540	1010	2420	2020
Vc = 200 m/min, *fz* = 0.4 mm/t																	
2870	2870	2290	2290	1790	3580	2690	1640	3280	1430	3580	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, *fz* = 0.5 mm/t																	
2390	2390	1910	1910	1490	2980	2240	1360	2720	1190	2980	2380	1190	950	2380	760	2280	1900
Vc = 150 m/min, *fz* = 0.5 mm/t																	
1590	630	1270	510	990	790	590	910	730	800	800	640	320	640	640	510	610	510
Vc = 100 m/min, *fz* = 0.2 mm/t																	
640	150	510	120	400	190	140	360	170	320	190	150	75	250	150	200	140	120
Vc = 40 m/min, *fz* = 0.12 mm/t																	

■ Notification for clamping

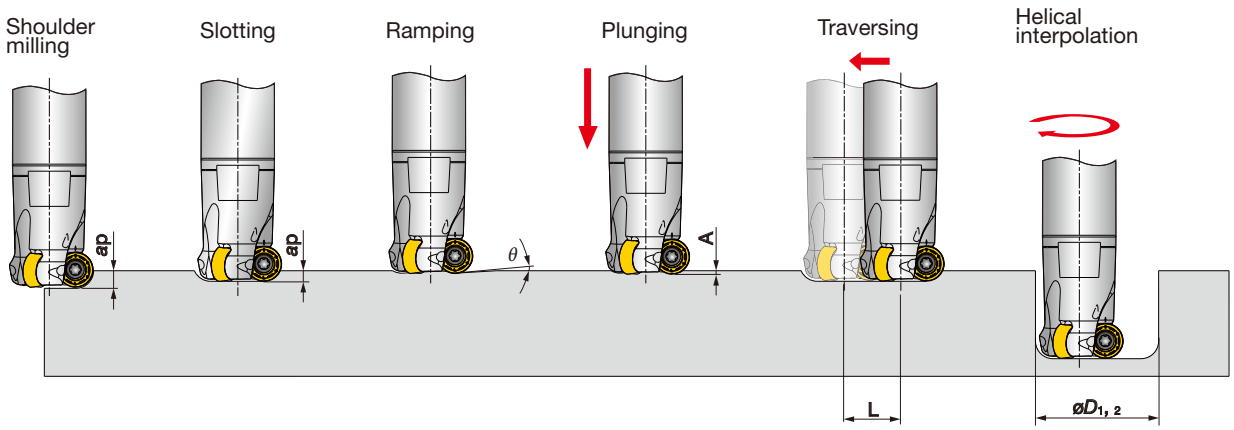
· When installing the insert, please carefully locate the insert in the seat and fasten the screw.



Make sure the insert cavity fits the protrusion on the body



APPLICATION RANGE



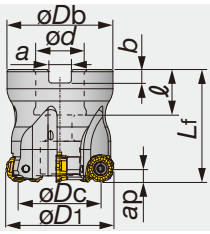
Designation	Tool-ø øDc (mm)	Max. depth of cut ap (mm)	Max. ramping angle θ°	Max. plunging depth A (mm)	Machining length for removing uncut portion L (mm)	Min.machining øD1(mm)	*Max. machining øD2 (mm)
E/HRP10R020M...	20	5	2	0.3	12	27	39
E/HRP10R025M...	25	5	3.1	0.7	16	35	49
E/HRP10R032M...	32	5	8	2.5	23	46	63
E/HRP12R032M...	32	6	9.2	2.5	21	43	63
ERP10R035M32.0-04	35	5	8.2	3	26	51	69
ERP12R040M32.0-04	40	6	3.8	1.6	29	59	79
ERP16R040M32.0-02	40	8	7	2.3	25	54	79
TRP10R040M16.0E05	40	5	6	2.7	31	62	79
TRP12R050M22.0E05	50	6	4	2.5	39	79	99
TRP12R052M22.0E05	52	6	4	2.5	41	83	103
TRP12R063M22.0E06	63	6	3	2.5	52	105	125
TRP12R066M27.0E06	66	6	2.8	2.5	55	111	131
TRP16R063M22.0E05	63	8	3.3	2.5	48	99	125
TRP16R066M27.0E05	66	8	3.1	2.5	51	105	131

*For flat bottom hole

ROUNDSPLIT
TRC12/16

Face mills with button insert of 6mm or 8mm radius

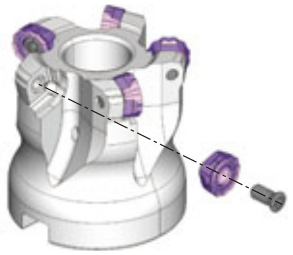
A.R. = +0°, R.R. = -1°~ -5°



Designation	Max. ap	øDc	z	øD1	øDb	Lf	ød	ℓ	a	b	Kg	Air hole	Insert
TRC12R040M16.0E04	6	28	4	40	35	40	16	19	8.4	5.6	0.2	with	RCMT1204...
TRC12R050M22.0E05	6	38	5	50	47	50	22	20	10.4	6.3	0.4	with	RCMT1204...
TRC12R052M22.0E05	6	40	5	52	49	50	22	20	10.4	6.3	0.4	with	RCMT1204...
TRC12R063M22.0E06	6	51	6	63	59	50	22	20	10.4	6.3	0.7	with	RCMT1204...
TRC12R066M22.0E06	6	54	6	66	62	50	22	20	10.4	6.3	0.7	with	RCMT1204...
TRC12R080M27.0E07	6	68	7	80	76	50	27	22	12.4	7	1.1	with	RCMT1204...
TRC16R050M22.0E04	8	34	4	50	47	50	22	20	10.4	6.3	0.3	with	RCMT1606...
TRC16R052M22.0E04	8	36	4	52	49	50	22	20	10.4	6.3	0.4	with	RCMT1606...
TRC16R063M22.0E05	8	47	5	63	59	50	22	20	10.4	6.3	0.6	with	RCMT1606...
TRC16R066M22.0E05	8	50	5	66	62	50	22	20	10.4	6.3	0.7	with	RCMT1606...
TRC16R080M27.0E06	8	64	6	80	76	50	27	22	12.4	7	1	with	RCMT1606...
TRC16R100M32.0E07	8	84	7	100	96	63	32	25	14.4	8	2.4	with	RCMT1606...
TRC16R125M40.0E08	8	109	8	125	98	63	40	32	16.4	9	3	with	RCMT1606...

SPARE PARTS

Designation	Clamping screw	Grip	Center bolt	Center bolt 1	Torx bit
TRC12R040...	CSTB-4L090	H-TBS	-	FSHM8-30H	BT15S
TRC12R050 - 066...	CSTB-4L090	H-TBS	-	CM10X30H	BT15S
TRC12R080M27.0E07	CSTB-4L090	H-TBS	-	CM12X30H	BT15S
TRC16R050 - 052...	CSTB-5L120	H-TB	-	FSHM10-40H	BT20S
TRC16R063 - 066...	CSTB-5L120	H-TB	-	CM10X30H	BT20S
TRC16R080M27.0E06	CSTB-5L120	H-TB	-	CM12X30H	BT20S
TRC16R100...	CSTB-5L120	H-TB	-	CM16X40H	BT20S
TRC16R125...	CSTB-5L120	H-TB	TMBA-M20H	-	BT20M



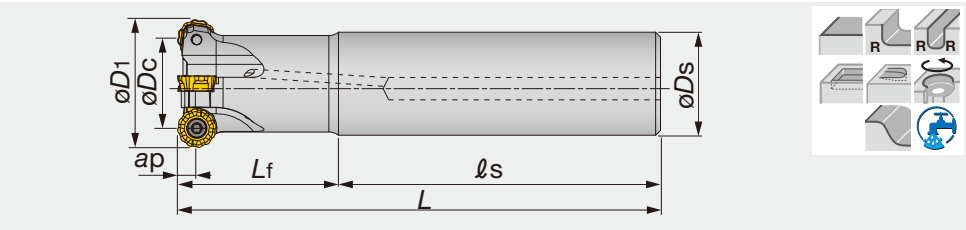
Reference pages

Inserts → **D201**, Standard cutting conditions → **D202**

ROUNDSPLIT
ERC12/16

Indexable endmills with button insert of 6mm or 8mm radius

A.R. = +0°, R.R. = -1°~ -5°



Designation	Max. ap	øDc	z	øD1	øDs	L	Lf	ℓs	Kg	Air hole	Insert
ERC12R032M32.0-03	6	20	3	32	32	150	70	80	0.8	with	RCMT1204...
ERC12R032M32.0-03L	6	20	3	32	32	250	150	100	1.3	with	RCMT1204...
ERC12R032M32.0-03LL	6	20	3	32	32	300	180	120	1.6	with	RCMT1204...
ERC12R033M32.0-03	6	21	3	33	32	150	70	80	0.8	with	RCMT1204...
ERC12R033M32.0-03L	6	21	3	33	32	250	150	100	1.4	with	RCMT1204...
ERC12R033M32.0-03LL	6	21	3	33	32	300	70	230	1.7	with	RCMT1204...
ERC12R040M32.0-04	6	28	4	40	32	150	50	100	0.8	with	RCMT1204...
ERC12R040M32.0-04L	6	28	4	40	32	250	50	200	1.5	with	RCMT1204...
ERC12R040M32.0-04LL	6	28	4	40	32	300	50	250	1.8	with	RCMT1204...
ERC12R050M42.0-05	6	38	5	50	42	150	50	100	1.5	with	RCMT1204...
ERC12R050M42.0-05L	6	38	5	50	42	250	50	200	2.6	with	RCMT1204...
ERC12R050M42.0-05LL	6	38	5	50	42	300	50	250	3	with	RCMT1204...
ERC16R040M32.0-02	8	24	2	40	32	150	50	100	0.8	with	RCMT1606...
ERC16R040M32.0-02L	8	24	2	40	32	250	50	200	1.4	with	RCMT1606...
ERC16R040M32.0-02LL	8	24	2	40	32	300	50	250	1.7	with	RCMT1606...
ERC16R050M42.0-03	8	34	3	50	42	150	50	100	1.4	with	RCMT1606...
ERC16R050M42.0-03L	8	34	3	50	42	250	50	200	2.4	with	RCMT1606...
ERC16R050M42.0-03LL	8	34	3	50	42	300	50	250	3	with	RCMT1606...

SPARE PARTS

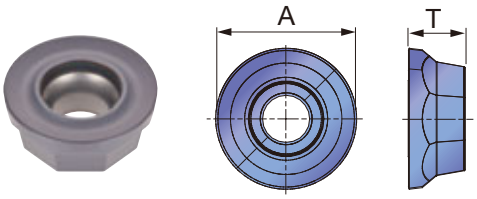
Designation	Clamping screw	Wrench
ERC12R...	CSTB-4L090	T-15DB
ERC16R040...	CSTB-5L105	T-20DB
ERC16R050...	CSTB-5L120	T-20DB

Reference pages

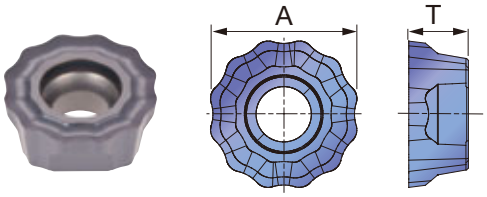
Inserts → **D201**, Standard cutting conditions → **D202**

INSERT

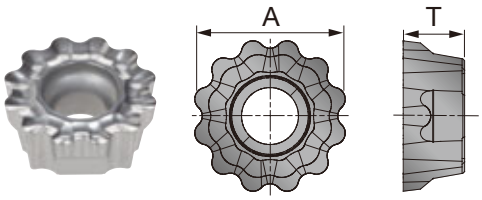
RCMT-MJ



RCMT-NMJ



RCMT-NAJ



		AH120	AH140	AH725	KS15F
P	Steel	☆		★	
M	Stainless		★	☆	
K	Cast iron	★		☆	
N	Non-ferrous				★
S	Superalloys	★		★	
H	Hard materials				

★ : First choice
☆ : Second choice

Designation	Max. ap	Coated			Un-coated	A	T
		AH120	AH140	AH725	KS15F		
RCMT1204EN-MJ	6	●	●	●		12	4.8
RCMT1204EN-NMJ	6	●	●	●		12	4.8
RCMT1204FN-NAJ	6				●	12	4.8
RCMT1606EN-MJ	8	●	●	●		16	6.5
RCMT1606EN-NMJ	8	●	●	●		16	6.5
RCMT1606FN-NAJ	8				●	16	6.5

●: Line up

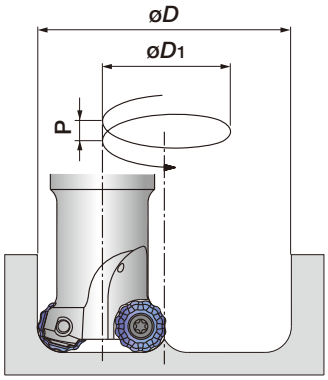
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness HB	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t) each chipbreaker		
					MJ	NMJ	NAJ
P	Low carbon steels C15E4, E275A, etc.	~ 200	AH725	100 - 220	0.2 - 0.7	0.17 - 0.3	-
	High carbon steels C45, C55, etc.	200 ~ 300	AH725	100 - 200	0.2 - 0.7	0.17 - 0.25	-
	Alloyed steels 42CrMo4, 20Cr4, etc.	150 ~ 300	AH725	100 - 200	0.2 - 0.7	0.17 - 0.25	-
	Tool steels X40CrMoV5-1, etc.	~ 300	AH725	100 - 180	0.2 - 0.7	0.17 - 0.25	-
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-3, etc.	-	AH140	90 - 180	0.2 - 0.6	0.15 - 0.25	-
K	Grey cast irons 250, 300, etc.	150 ~ 250	AH120	140 - 250	0.2 - 0.7	0.17 - 0.3	-
	Ductile cast irons 400-15S, etc.	150 ~ 250	AH120	140 - 250	0.2 - 0.7	0.17 - 0.3	-
N	Aluminium alloys Si < 13%	-	KS15F	500 - 1200	-	-	0.1 - 0.3
	Aluminium alloys Si ≥ 13%	-	KS15F	100 - 300	-	-	0.1 - 0.3
S	Heat-resisting alloy Inconel 718, Ti-6Al-4V, etc.	-	AH725	20 - 50	0.2 - 0.6	0.15 - 0.25	-

· To remove excessive chip accumulation use an air blast.
· When chips stick to the cutting edges (aluminium machining), use a water soluble cutting fluid.

· Cutting conditions are limited by machine power and material rigidity. When the cutting width or depth is large, set Vc and fz below the recommended values and check the machine vibration and spindle load.

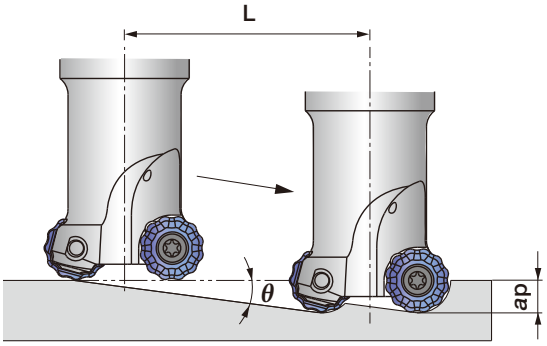
Holemaking with helical feed



Designation	Tool ø øDc (mm)	Min. machining diameter (mm)		Max. machining diameter (mm)		Pitch P (mm)
		øD	øD1	øD	øD1	
ERC12R032…	ø32	52	20	62	30	< 6
ERC12R033…	ø33	54	21	64	31	< 6
T/ERC12R040…	ø40	68	28	78	38	< 6
T/ERC12R050…	ø50	88	38	98	48	< 6
TRC12R063…	ø63	114	51	124	61	< 6
TRC12R080…	ø80	148	68	158	78	< 6
ERC16R040…	ø40	64	24	78	38	< 8
T/ERC16R050…	ø50	84	34	98	48	< 8
TRC16R063…	ø63	110	47	124	61	< 8
TRC16R080…	ø80	144	64	158	78	< 8
TRC16R100…	ø100	184	84	198	98	< 8
TRC16R125…	ø125	234	109	248	123	< 8

When holemaking with a helical feed, the pitch (P) needs to be set at lower values than that shown above.

Ramping



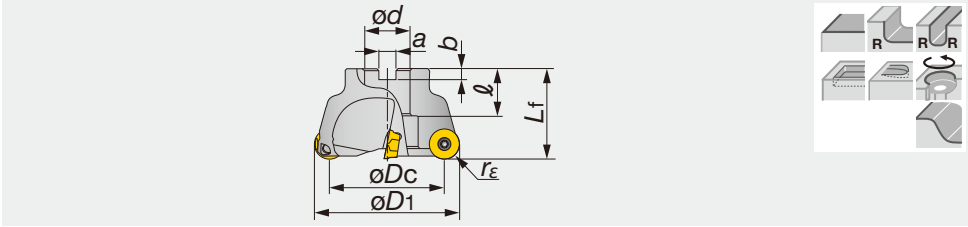
Designation	Tool ø øDc (mm)	Max. ramping angle θ°	L: tool pass length when ramping angle is 2 degrees				
			ap (mm)				
			2	3	4	6	8
ERC12R032…	ø32	10	57	85	114	171	–
ERC12R033…	ø33	9	57	85	114	171	–
T/ERC12R040…	ø40	6	57	85	114	171	–
T/ERC12R050…	ø50	4	57	85	114	171	–
TRC12R063…	ø63	3	57	85	114	171	–
TRC12R080…	ø80	2.3	57	85	114	171	–
ERC16R040…	ø40	12	57	85	114	171	229
T/ERC16R050…	ø50	7.4	57	85	114	171	229
TRC16R063…	ø63	6	57	85	114	171	229
TRC16R080…	ø80	4.3	57	85	114	171	229
TRC16R100…	ø100	3	57	85	114	171	229
TRC16R125…	ø125	2.4	57	85	114	171	229

Tool pass length: L = ap / tan θ, Ramping angle needs to be set at smaller than 2 degrees in order to prevent chips from getting tangled.

TRD12/16

Face mills with button insert of 6 mm or 8 mm radius

A.R. = +10°, R.R. = -6°~ 0°



Designation	Max. ap	øDc	z	øD1	Lf	ød	ℓ	a	b	rε	Kg	Insert
TRD12050R-E	6	38	4	50	40	22	20	10.4	6.3	6	0.3	RDM*1204...
TRD12052R-E	6	40	4	52	40	22	20	10.4	6.3	6	0.3	RDM*1204...
TRD12063R-E	6	51	5	63	40	22	20	10.4	6.3	6	0.4	RDM*1204...
TRD12066R-E	6	54	5	66	40	22	20	12.4	7	6	0.5	RDM*1204...
TRD12080R-E	6	68	6	80	50	27	22	12.4	7	6	0.8	RDM*1204...
TRD12100R-E	6	88	6	100	50	32	26	14.4	8	6	1.4	RDM*1204...
TRD16063R-E	8	47	4	63	40	22	20	10.4	6.3	8	0.4	RDM*1606...
TRD16066R-E	8	50	4	66	50	27	22	12.4	7	8	0.5	RDM*1606...
TRD16080R-E	8	64	5	80	50	27	22	12.4	7	8	0.7	RDM*1606...
TRD16100R-E	8	84	6	100	50	32	26	14.4	8	8	1.1	RDM*1606...

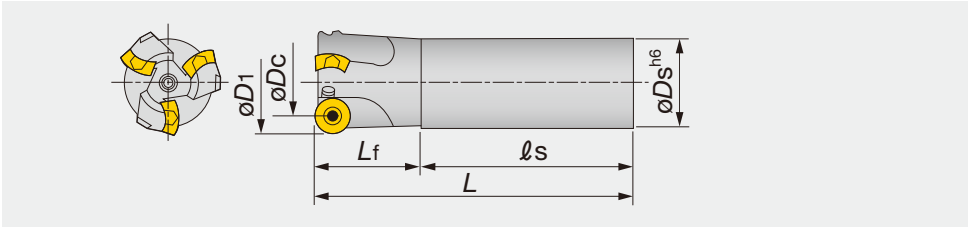
SPARE PARTS

Designation	Clamp screw	Lubricant	Center bolt	Wrench
TRD12...-E	CSTB-3.5	M-1000	-	T-15D
TRD16...-E	CSTB-5	M-1000	-	T-20D

ERD12/16

Indexable endmills with button insert of 6 mm or 8 mm radius

A.R. = +8°~ 10°, R.R. = -6°~ -2°



Designation	Max. ap	øDc	z	øD1	øDs	L	Lf	ℓs	Insert
ERD12032RS	6	20	2	32	32	150	50	100	RDM*1204...
ERD12032RL	6	20	2	32	32	250	50	200	RDM*1204...
ERD12040RS	6	28	3	40	32	150	50	100	RDM*1204...
ERD12040RL	6	28	3	40	32	250	50	200	RDM*1204...
ERD12050RS	6	38	4	50	42	150	50	100	RDM*1204...
ERD12050RL	6	38	4	50	42	250	50	200	RDM*1204...
ERD12063RS	6	51	4	63	42	150	50	100	RDM*1204...
ERD12063RL	6	51	4	63	42	250	50	200	RDM*1204...
ERD16040RS	8	24	2	40	32	150	50	100	RDM*1606...
ERD16040RL	8	24	2	40	32	250	50	200	RDM*1606...
ERD16050RS	8	34	3	50	42	150	50	100	RDM*1606...
ERD16050RL	8	34	3	50	42	250	50	200	RDM*1606...
ERD16063RS	8	47	3	63	42	150	50	100	RDM*1606...
ERD16063RL	8	47	3	63	42	250	50	200	RDM*1606...

SPARE PARTS

Designation	Clamp screw	Lubricant	Wrench
ERD120**R*	CSTB-3.5	M-1000	T-15D
ERD160**R*	CSTB-5	M-1000	T-20D

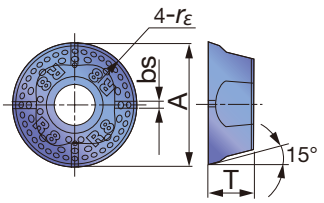
Reference pages

Inserts , Standard cutting conditions → **D205**

INSERT

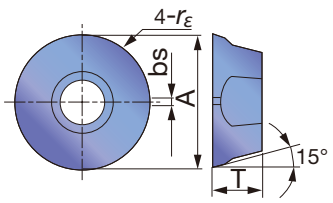
RDMT12/16-MJ

Button insert with pressed MJ chipbreaker



RDMW12/16

Flat-top button insert with 6 mm or 8 mm radius



P	Steel	☆			★	★		☆	
M	Stainless		★	☆					
K	Cast iron	★							
N	Non-ferrous								
S	Superalloys	★	☆						
H	Hard materials								

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated					Un-coated	A	T	bs
			AH120	AH130	AH140	AH330	T3130	UX30			
RDMT1204ZDPN-MJ	6	6	●		●	●	●	●	12.8	4.76	0.8
RDMW1204ZDSN	6	6	●		●		●		12.8	4.8	0.8
RDMT1606ZDPN-MJ	8	8	●	●	●	●	●	●	16.8	6.35	0.8
RDMW1606ZDSN	8	8	●		●		●		16.8	6.4	0.8

●: Line up

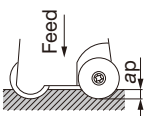
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed Vc (m/min)	Feed per tooth f (mm/t) T/ERD12	Feed per tooth f (mm/t) T/ERD16
P	Carbon steels C50, etc. < 300 HB	AH120	170 (120 ~ 220)	0.3 ~ 0.5	0.3 ~ 0.6
		AH330	190 (140 ~ 240)	0.2 ~ 0.4	0.2 ~ 0.5
		UX30	100 (80 ~ 120)	0.2 ~ 0.4	0.2 ~ 0.5
	Alloy steels 42CrMo4, 17Cr3, etc. < 300 HB	AH120	150 (100 ~ 200)	0.2 ~ 0.45	0.2 ~ 0.5
		AH330	170 (120 ~ 220)	0.15 ~ 0.35	0.15 ~ 0.4
		UX30	90 (60 ~ 120)	0.15 ~ 0.35	0.15 ~ 0.4
	Die steels X96CrMoV12, etc. < 300 HB	AH120	130 (80 ~ 180)	0.2 ~ 0.35	0.25 ~ 0.45
		AH330	150 (100 ~ 200)	0.1 ~ 0.3	0.1 ~ 0.4
M	Stainless steels X5CrNi18 9, etc.	AH130·AH140	150 (100 ~ 200)	0.2 ~ 0.3	0.2 ~ 0.4
K	Grey Cast irons 250, etc.	AH120	180 (120 ~ 240)	0.3 ~ 0.5	0.3 ~ 0.6
		AH330	200 (150 ~ 250)	0.2 ~ 0.4	0.2 ~ 0.5
H	Hard materials < 45 HRC	AH120	100 (60 ~ 140)	0.08 ~ 0.25	0.1 ~ 0.3

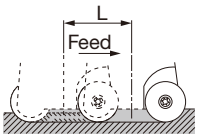
Note: When the depth of cut is smaller than 2 mm, use the higher limit of feed values shown above. When larger than 3 mm, use the lower limit of the feed values.

Plunging + traverse feed milling (Unit: mm)

Plunging

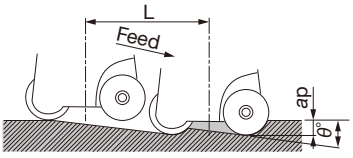


Traverse feed milling

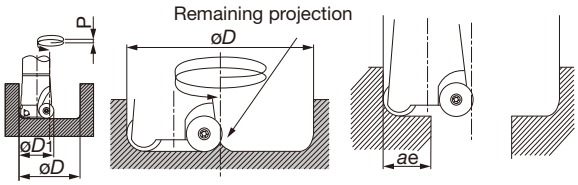


Unit: mm

Ramping



Helical feed drilling



Designation	øD1	Max. plunging depth ap	Max. ramping angle θ°	Min. traverse length to flatten the bottom surface L	Min. machining diameter øD	Max. machining diameter øD	Pitch P	øDc-ra ae
TRD12050R...	50	4	6	øD1 - 11	88	98	< 6	44
TRD12052R-E	52	4	5.5	øD1 - 11	92	102	< 6	46
TRD12063R...	63	4	4	øD1 - 11	114	124	< 6	57
TRD12066R...	66	4	4	øD1 - 11	120	130	< 6	60
TRD12080R...	80	4	2.5	øD1 - 11	148	158	< 6	74
TRD12100R...	100	4	1.5	øD1 - 11	188	198	< 6	94
TRD16063R...	63	5.5	6	øD1 - 15	110	124	< 8	55
TRD16066R...	66	5.5	6	øD1 - 15	120	130	< 8	58
TRD16080R...	80	5.5	4	øD1 - 15	144	158	< 8	72
TRD16100R...	100	5.5	3	øD1 - 15	184	198	< 8	92
ERD12032RS/L	32	4	16	øD1 - 11	52	62	< 6	26
ERD12040RS/L	40	4	8	øD1 - 11	68	78	< 6	34
ERD12050RS/L	50	4	6	øD1 - 11	88	98	< 6	44
ERD12063RS/L	63	4	4	øD1 - 11	114	124	< 6	57
ERD16040RS/L	40	5.5	20	øD1 - 15	64	78	< 8	32
ERD16050RS/L	50	5.5	10	øD1 - 15	84	98	< 8	42
ERD16063RS/L	63	5.5	6	øD1 - 15	110	124	< 8	55

*øD*1 : Tool diameter
øD : Drilling diameter
P : Z-axis feed per one round of tool pass (Pitch of helical cycle)

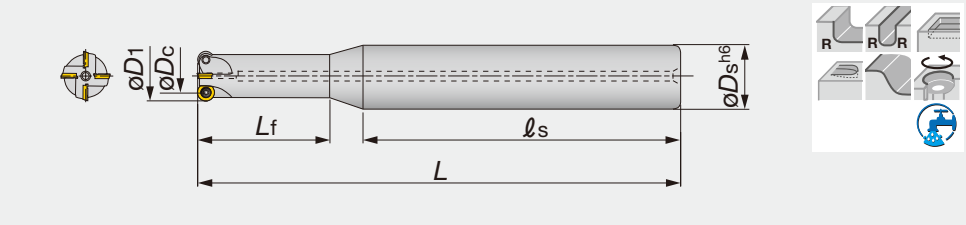
Notes:
- In plunging, the maximum plunging depth is limited as shown in the above table.
- In plunging, set the Z-axis feed in a range of 0.05 to 0.1 mm/t.
- When plunging, use peck-feed every 1 mm (or smaller than 1 mm) to break chips.
- tan*θ* = depth of cut: *ap* / length of tool pass: L
- In ramping, the ramping angle should be set within the maximum ramping angle.
- In helical feed hole machining, the machinable hole diameters are limited by the tool diameter as shown in the above tables.
- When machining between the minimum and maximum machining diameters, a projection remains in the center of the bottom surface of the hole as shown in the Figure at right. Remove it by traverse feed milling.

MEMO

EWD05/07/10

Indexable endmills with buttom inserts of 2.5, 3.5, and 5 mm radius

A.R. = 0°, R.R. = -3°~ +0.5°



Designation	Max. ap	øDc	z	øD1	øDs	ℓs	Lf	L	Air hole	Insert
EWD05010R	2.5	5	2	10	20	80	20	130	with	RDMW05...
EWD05012R	2.5	7	3	12	20	80	20	130	with	RDMW05...
EWD07015R	3.5	8	3	15	20	100	40	150	with	RDMW07...
EWD05015R	2.5	10	4	15	20	100	40	150	with	RDMW05...
EWD10020R	5.0	10	2	20	25	120	40	170	with	RDMW10...
EWD07020R	3.5	13	4	20	25	120	40	170	with	RDMW07...
EWD05020R	2.5	15	5	20	25	120	40	170	with	RDMW05...
EWD10025R	5.0	15	3	25	32	125	45	195	with	RDMW10...
EWD07025R	3.5	18	5	25	32	125	45	195	with	RDMW07...

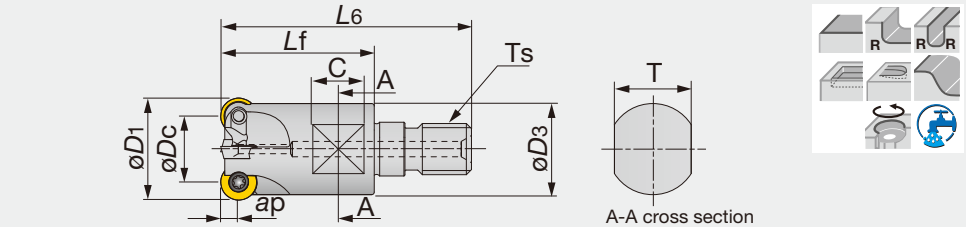
SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
EWD050**R	CSTD-1.8	M-1000	T-6D
EWD070**R	CSTB-2.5S	M-1000	T-8D
EWD100**R	CSTB-3.5H	M-1000	T-15D

HWD07-M

Indexable endmills with TungFlex, carrying buttom inserts of 3.5 mm radius

A.R. = 0°, R.R. = -3°~ +0.5°



Designation	Max. ap	øDc	z	øD1	L6	Lf	C	T	øD3	Ts	Kg	Air hole
HWD07R015MM08-03	3.5	8	3	15	42	25	8	10	12.8	M8	0.03	with
HWD07R020MM10-04	3.5	13	4	20	49	30	10	15	17.8	M10	0.06	with
HWD07R025MM12-05	3.5	18	5	25	57	35	10	17	20.8	M12	0.1	with
HWD07R030MM16-05	3.5	23	5	30	63	40	12	22	28.8	M16	0.2	with

See page **D192** for TungFlex modular shank.

SPARE PARTS

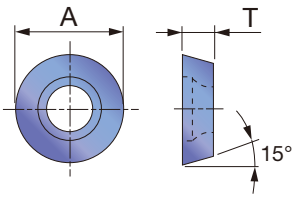
Designation	Clamping screw	Lubricant	Wrench
HWD07-M...	CSTB-2.5S	M-1000	T-8D

Reference pages

Inserts, Standard cutting conditions → **D209**

INSERT

RDMW05/07/10



P	Steel	★
M	Stainless	
K	Cast iron	★
N	Non-ferrous	
S	Superalloys	★
H	Hard materials	

★ : First choice
☆ : Second choice

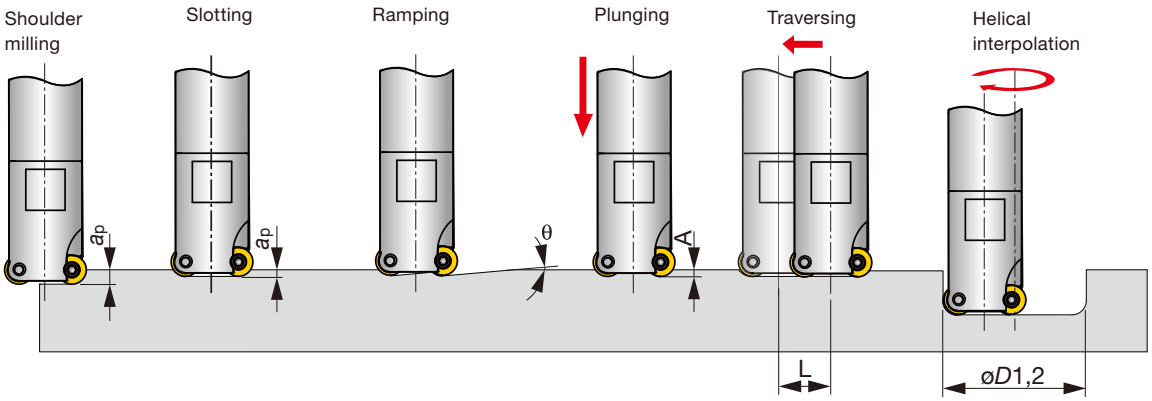
Designation	Max. ap	Coated AH120	A	T
RDMW0501M0	2.5	●	5	1.4
RDMW0702M0	3.5	●	7	2.38
RDMW1003M0	5.0	●	10	3.18

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Depth of cut *ap* (mm) Cutter dia. ø10, 12	Cutter dia. ø15, 20	Cutter dia. ø25
P	Carbon steels C45, etc. < 300 HB	AH120	200 ~ 500	0.15 ~ 0.45	~ 0.5	~ 0.7	~ 1
P	Alloy steels 42CrMo4, etc. < 300 HB	AH120	120 ~ 350	0.15 ~ 0.35	~ 0.5	~ 0.7	~ 1
P	Die steels X40CrMoV5-1, etc. < 300 HB	AH120	100 ~ 300	0.1 ~ 0.3	~ 0.5	~ 0.7	~ 1
K	Cast irons 250, etc.	AH120	200 ~ 500	0.2 ~ 0.5	~ 0.5	~ 0.7	~ 1
H	Hardened steels, Prehardened steels < 40HRC	AH120	70 ~ 200	0.1 ~ 0.25	~ 0.5	~ 0.7	~ 1

APPLICATION RANGE

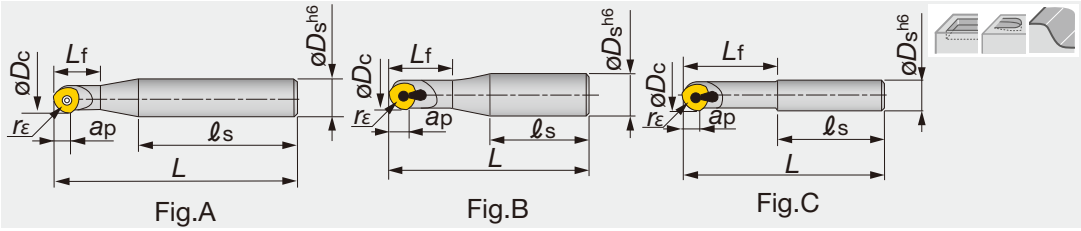


Designation	Tool-ø øDc	Max. depth of cut ap	Max. ramping θ°	Max. plunging depth A	Machining length for removing uncut portion L	Max. machining øD1	*Max. machining øD2
HWD07R015MM08-03	15	3.5	25	2	øDc - 6	23	28
HWD07R020MM10-04	20	3.5	11	2	øDc - 6	33	38
HWD07R025MM12-05	25	3.5	7	2	øDc - 6	43	48
HWD07R030MM16-05	30	3.5	5.5	2	øDc - 6	53	58

*For flat bottom hole

TBN1000

Indexable ball-nose endmill for semi-finishing



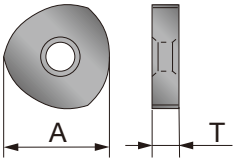
Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	rε	Insert	Fig.
TBN1100S	5	10	1	16	60	15	90	5	ZNCA1002FN2	A
TBN1120S	6	12	1	16	70	20	110	6	ZNCA1203FN	A
TBN1160S	8	16	1	20	85	25	130	8	ZNCA1603FN	A
TBN1200S	10	20	1	25	100	35	160	10	ZN**2004...	A
TBN1250S	12.5	25	1	32	100	45	175	12.5	ZN**2505...	B
TBN1300S	15	30	1	32	100	90	190	15	ZN**3005...	C

SPARE PARTS

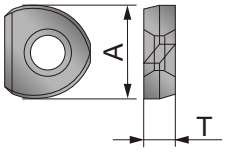
Designation	Clamping screw	Clamp	Right-left screw	Wrench
TBN1100S	CSTB-2.5B	-	-	T-8D
TBN1120S	CSTB-3S	-	-	T-9D
TBN1160S	CSTB-4S	-	-	T-15D
TBN1200S	CSTA-5SS	-	-	T-15D
TBN1250S, 1300S	CSTA-5S	CP536	DS-6T	T-15D

INSERT

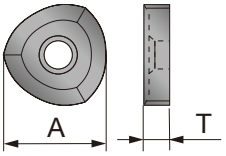
ZNCA-FN



ZNCA-FN2



ZNMM-EN



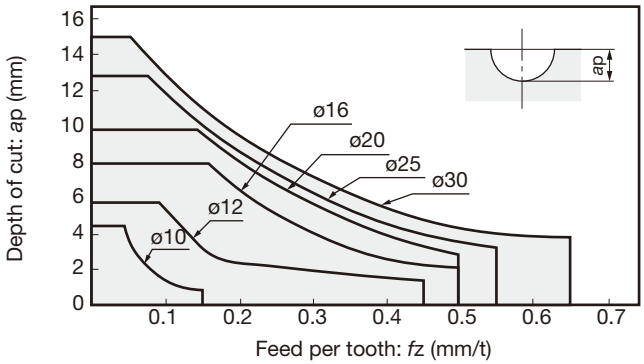
| | | Uncoated | | |

STANDARD CUTTING CONDITIONS

For finishing

ISO	Workpiece material	Grade	Cutting Speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Pick feed *Pf* (mm)
P	High carbon steel C45, C55, etc.	UX30	80 - 120	0.1 - 0.3	0.3 - 0.5
	Tool steel X153CrMoV12, etc.	UX30	60 - 100	0.08 - 0.25	0.3 - 0.5
K	Cast iron 250, 400-15S, etc.	TH10	80 - 120	0.1 - 0.5	0.3 - 0.5

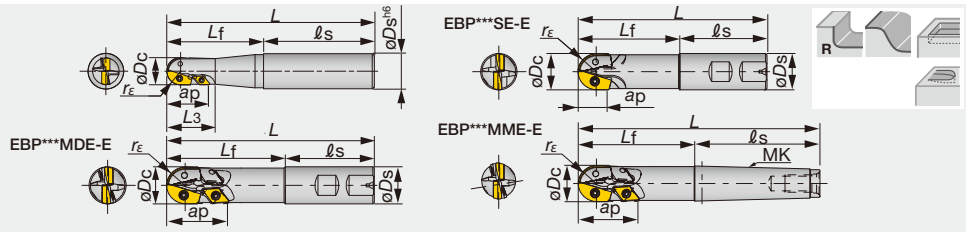
GUIDELINES FOR SELECTING DEPTH OF CUT AND FEED



Workpiece material: Carbon steel (JIS S55C)
Insert grade: UX30
Machine power: ø10 ~ ø16: 7.5 kW
ø20 ~ ø30: 22.5 kW
No. of revolutions: ø10 ~ ø16: 2000 min^{-1}
ø20 ~ ø30: 1500 min^{-1}

EBP

Indexable ball-nose endmill for semi-finishing



Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	L3	rε	MK	Insert 1	Insert 2
EBP020SD-E	16	20	2	20	56	60	116	-	10	-	ZPET2004-MJ	-
EBP020SS	16	20	2	25	80	60	140	30	10	-	ZPET2004-MJ	-
EBP020MDE-E	29.5	20	2 (4)	20	56	70	126	-	10	-	ZPET2004-MJ	DCMW070204TN
EBP020MME-E	29.5	20	2 (4)	-	69	70	139	-	10	MK2	ZPET2004-MJ	DCMW070204TN
EBP020MSE	29.5	20	2 (4)	25	80	70	150	35	10	-	ZPET2004-MJ	DCMW070204TN
EBP020LSE	29.5	20	2 (4)	25	180	70	250	35	10	-	ZPET2004-MJ	DCMW070204TN
EBP025SD-E	21	25	2	25	60	70	130	-	12.5	-	ZPET2505-MJ	-
EBP025SS	21	25	2	32	80	70	150	35	12.5	-	ZPET2505-MJ	-
EBP025MDE-E	41	25	2 (4)	25	60	80	140	-	12.5	-	ZPET2505-MJ	DCMW11T304TN
EBP025MME-E	41	25	2 (4)	-	86	-	166	-	12.5	MK3	ZPET2505-MJ	DCMW11T304TN
EBP025MSE	41	25	2 (4)	32	100	80	180	50	12.5		ZPET2505-MJ	DCMW11T304TN
EBP025LSE	41	25	2 (4)	32	220	80	300	50	12.5	-	ZPET2505-MJ	DCMW11T304TN
EBP030SS	24	30	2	32	80	80	160	40	15	-	ZPET3006-MJ	-
EBP030MSE	45	30	2 (4)	32	100	100	200	55	15	-	ZPET3006-MJ	DCMW11T304TN
EBP030LSE	45	30	2 (4)	32	250	100	350	55	15	-	ZPET3006-MJ	DCMW11T304TN
EBP032SD-E	25	32	2	32	60		140	-	16	-	ZPET3206-MJ	-
EBP032MDE-E	46	32	2 (4)	32	60	100	160	-	16	-	ZPET3206-MJ	DCMW11T304TN
EBP032MME-E	46	32	2 (4)	-	109	100	209	-	16	MK4	ZPET3206-MJ	DCMW11T304TN

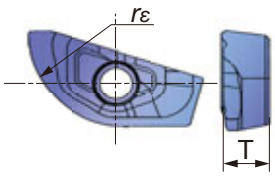
SPARE PARTS

Designation	Clamping screw for Insert 1	Clamping screw for Insert 2	Lubricant	Wrench for Insert 1	Wrench 1 for Insert 1
EBP020SS/SD-E	CSTD-3T	-	M-1000	T-10D	-
EBP025SS/SD-E	CSTB-4S	-	M-1000	T-15D	-
EBP030SS/032SD-E	CSTB-5S	-	M-1000	T-20D	-
EBP020*SE/M*E-E	CSTB-2.5S	CSTD-3T	M-1000	T-10D	T-8D
EBP025*SE/M*E-E	CSTB-4S	-	M-1000	T-15D	-
EBP030*SE/032M*E-E	CSTB-4S	CSTB-5S	M-1000	T-15D	T-20D

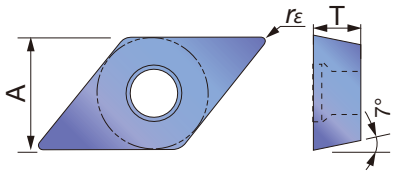
Profile Milling

INSERT

ZPET-MJ (for Radius)



DCMW-TN (for Peripheral)



		Coated	
		AH120	AH330
P	Steel	☆	★
M	Stainless		
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys		
H	Hard materials	☆	

★ : First choice
☆ : Second choice

Designation	rε	AH120	AH330	A	T
ZPET2004-MJ	10	●	●	-	4.5
ZPET2505-MJ	12.5	●	●	-	4.63
ZPET3006-MJ	15	●	●	-	6.75
ZPET3206-MJ	16	●	●	-	6.75
DCMW070204TN	0.4	●	●	6.4	2.4
DCMW11T304TN	0.4	●	●	9.5	4

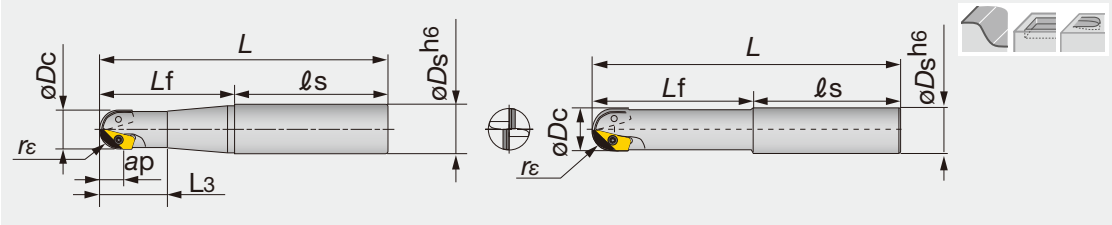
●: Line up

Reference pages

Standard cutting conditions → **D215**

EBB

Indexable ball-nose endmill for semi-finishing with CBN insert



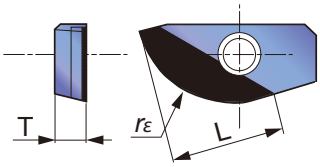
Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	L3	rε	Insert
EBB020MS	12	20	2	25	80	70	150	35	10	ZPCW2003-QBN
EBB025MS	15.5	25	2	32	100	80	180	50	12.5	ZPCW25H3-QBN
EBB030MS	18	30	2	32	100	100	200	-	15	ZPCW30T3-QBN
EBB040MS	23	40	2	42	100	150	250	-	20	ZPCW4004-QBN
EBB050MS	28	50	2	50	100	150	250	-	25	ZPCW5004-QBN

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench	Clamp set
EBB020MS	CSTB-3S	M-1000	T-9D	-
EBB025MS	CSTB-3.5	M-1000	T-15D	-
EBB030MS	CSTB-4S	M-1000	T-15D	-
EBB040MS	CSTB-5	M-1000	T-20D	CSP22
EBB050MS	CSTB-5	M-1000	T-20D	CSP22

INSERT

ZPCW-QBN



P	Steel	
M	Stainless	
K	Cast iron	★
N	Non-ferrous	
S	Superalloys	
H	Hard materials	

★ : First choice
☆ : Second choice

Designation	rε	CBN BX950	T	L
ZPCW2003-QBN	10	●	3.18	12
ZPCW25H3-QBN	12.5	●	3.5	15.5
ZPCW30T3-QBN	15	●	3.97	18
ZPCW4004-QBN	20	●	4.76	23
ZPCW5004-QBN	25	●	4.76	28

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	No. of revolutions n (min^{-1})	Feed per tooth fz (mm/t)	Depth of cut ap (mm)	Pick feed Pf (mm)
K	Cast irons 250, etc.	5,000 ~ 15,000	0.2 ~ 0.5	~ 1	~ 3
	Ductile cast irons 600-3, etc.	5,000 ~ 15,000	0.2 ~ 0.5	~ 1	~ 3

EBD

Indexable ball-nose endmill for roughing

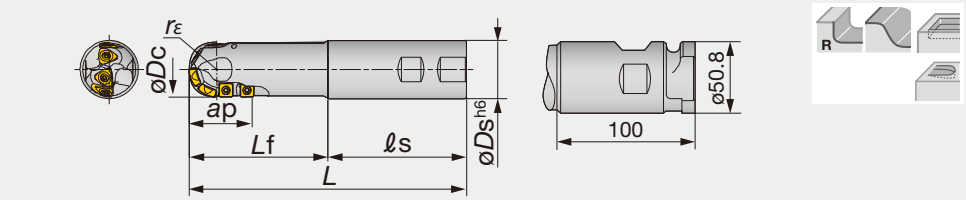


Fig. A Fig. B Combination shank

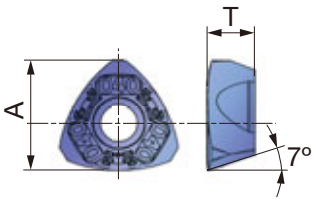
Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	rε	Fig.	Insert for R	Insert for P
EBD040SSE	45	40	4 (7)	42	100	100	200	20	A	ZDMT4005-MJ	SCMT09T308-23
EBD040MSE	45	40	4 (7)	42	100	150	250	20	A	ZDMT4005-MJ	SCMT09T308-23
EBD050SSE	59	50	4 (7)	42	100	100	200	25	A	ZDMT5006-MJ	SCMT120408-23
EBD050MSE	59	50	4 (7)	42	100	150	250	25	A	ZDMT5006-MJ	SCMT120408-23
EBD050SCE	59	50	4 (7)	50.8	100	100	200	25	B	ZDMT5006-MJ	SCMT120408-23
EBD050MCE	59	50	4 (7)	50.8	100	150	250	25	B	ZDMT5006-MJ	SCMT120408-23

SPARE PARTS

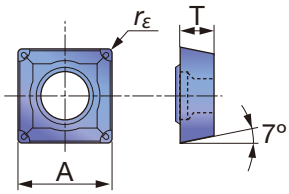
Designation	Clamping screw	Lubricant	Wrench
EBD040*SE	CSTB-4M	M-1000	T-15T
EBD050**E	CSTB-5	M-1000	T-20T

INSERT

ZDMT-MJ (For R-edge)



SCMT-23 (For peripheral edge)



P	Steel	☆
M	Stainless	
K	Cast iron	★
N	Non-ferrous	
S	Superalloys	
H	Hard materials	☆

★ : First choice
☆ : Second choice

Designation	rε	Coated AH120	A	T
ZDMT4005-MJ	-	●	13	5.5
ZDMT5006-MJ	-	●	16.2	6.5
SCMT09T308-23	0.8	●	9.525	3.97
SCMT120408-23	0.8	●	12.7	4.76

●: Line up

Profile Milling

Reference pages

Standard cutting conditions → **D215**

STANDARD CUTTING CONDITIONS

EBP

ISO	Workpiece material	Grade	Machining type	Cutting speed *Vc* (m/min)	Table feed *vf* (mm/min)		
					Tool dia. ø20	Tool dia. ø25	Tool dia. ø30 - ø32
P	Carbon steels C55, etc. < 300 HB	AH120	(1)	200 (170 ~ 230)	760 (610 ~ 910)	610 (460 ~ 760)	510 (360 ~ 660)
		AH120	(2)	230 (200 ~ 260)	1100 (900 ~ 1300)	880 (680 ~ 1080)	730 (530 ~ 930)
		AH120	(3)	180 (150 ~ 200)	570 (420 ~ 350)	460 (310 ~ 610)	380 (230 ~ 530)
	Alloy steels 42CrMo4, etc. < 300 HB	AH120	(1)	180 (150 ~ 210)	680 (530 ~ 830)	550 (400 ~ 700)	450 (300 ~ 600)
		AH120	(2)	210 (180 ~ 240)	1000 (800 ~ 1200)	800 (600 ~ 400)	670 (470 ~ 870)
		AH120	(3)	160 (130 ~ 180)	510 (360 ~ 660)	400 (250 ~ 550)	340 (190 ~ 490)
	Die steels X96CrMoV12, etc. < 300 HB	AH330	(1)	150 (120 ~ 180)	570 (420 ~ 720)	460 (310 ~ 610)	380 (230 ~ 530)
		AH330	(2)	180 (150 ~ 210)	860 (660 ~ 1060)	690 (490 ~ 890)	570 (370 ~ 770)
		AH330	(3)	130 (100 ~ 150)	410 (260 ~ 560)	330 (180 ~ 480)	280 (130 ~ 430)
K	Cast irons 250, etc.	AH120	(1)	200 (170 ~ 230)	950 (800 ~ 1100)	760 (610 ~ 910)	640 (490 ~ 790)
		AH120	(2)	230 (200 ~ 260)	1200 (900 ~ 1400)	1000 (700 ~ 1200)	830 (530 ~ 1030)
		AH120	(3)	180 (150 ~ 200)	570 (420 ~ 720)	460 (310 ~ 610)	380 (230 ~ 530)
H	Hardened steels Prehardened steels < 45 HRC	AH120	(1)	80 (60 ~ 100)	250 (150 ~ 350)	200 (100 ~ 300)	160 (100 ~ 260)
		AH120	(2)	100 (70 ~ 130)	310 (160 ~ 460)	250 (100 ~ 400)	210 (100 ~ 360)
		AH120	(3)	60 (40 ~ 80)	190 (140 ~ 240)	150 (100 ~ 200)	130 (80 ~ 180)

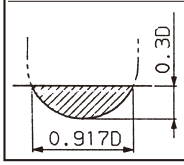
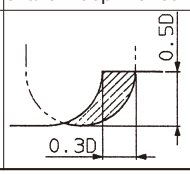
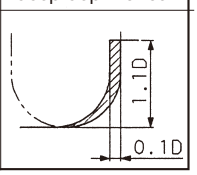
Notes:
- Cutting speeds shown in the left table are of the most outer diameter of the tool.
- When the depth of cut is the upper limit shown in the above figures, set the cutting conditions to the lowest values shown left.
- When using long edge types (MSE), set the cutting speed and feed to 60 to 80 % of values shown in the table.
- When using long shank types (LSE), set the cutting speed and feed to 20 to 50 % of values shown in the table, bearing in mind the overhang length.

EBD

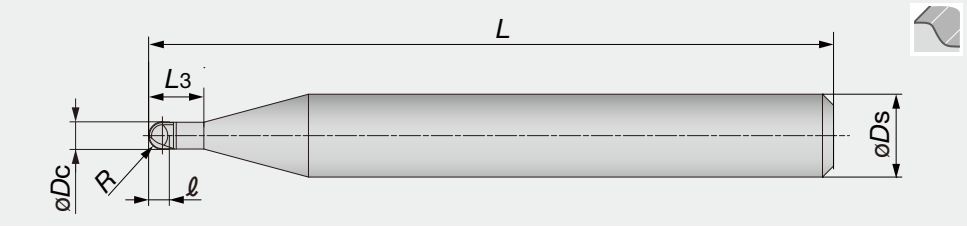
ISO	Workpiece material	Grade	Machining type	Cutting speed *Vc* (m/min)	Table feed *vf* (mm/min)	
					Tool dia. ø40	Tool dia. ø50
P	Carbon steels C55, etc. < 300 HB	AH120	(1)	180 (150 ~ 210)	490 (400 ~ 570)	390 (330 ~ 460)
		AH120	(2)	200 (170 ~ 230)	480 (410 ~ 550)	380 (330 ~ 440)
		AH120	(3)	160 (130 ~ 190)	260 (210 ~ 300)	200 (160 ~ 240)
	Alloy steels 42CrMo4, etc. < 300 HB	AH120	(1)	160 (130 ~ 190)	430 (350 ~ 510)	350 (280 ~ 410)
		AH120	(2)	180 (150 ~ 210)	430 (360 ~ 500)	340 (290 ~ 400)
		AH120	(3)	140 (110 ~ 170)	220 (180 ~ 270)	180 (140 ~ 220)
	Die steels X96CrMoV12, etc. < 300 HB	AH120	(1)	140 (110 ~ 170)	380 (300 ~ 460)	300 (240 ~ 370)
		AH120	(2)	160 (130 ~ 190)	380 (310 ~ 460)	310 (250 ~ 360)
		AH120	(3)	120 (90 ~ 150)	190 (140 ~ 240)	150 (120 ~ 190)
K	Cast irons 250, etc.	AH120	(1)	200 (170 ~ 230)	640 (510 ~ 680)	510 (410 ~ 540)
		AH120	(2)	220 (190 ~ 250)	600 (510 ~ 680)	480 (410 ~ 540)
		AH120	(3)	180 (150 ~ 210)	340 (290 ~ 400)	280 (230 ~ 320)
H	Hardened steels Prehardened steels < 45 HRC	AH120	(1)	90 (70 ~ 110)	210 (160 ~ 260)	170 (130 ~ 210)
		AH120	(2)	100 (80 ~ 120)	200 (160 ~ 250)	160 (130 ~ 200)
		AH120	(3)	60 (50 ~ 90)	100 (80 ~ 140)	80 (60 ~ 120)

Notes:
- Cutting speeds shown in the left table are of the most outer diameter of the tool.
- The values of the cutting speeds and feeds shown in the table are of under general cutting conditions. The values should be modified depending on the power and rigidity of the machine to be used, and work holding conditions.
- When using the long shank type, the depth of cut, pick feed, cutting speed, and table feed should be reduced to 70 %-90 % of the values shown in the tables.

Machining types

(1) Grooving	(2) Shouldering at shallow depth of cut	(3) Shouldering at deep depth of cut
		

Profile Milling



Designation	BX850	z	R	øDc	ℓ	L3	L	øDs
BBB2006	●	2	0.3	0.6	0.5	1.2	50	6
BBB2008	●	2	0.4	0.8	0.6	1.6	50	6
BBB2010	●	2	0.5	1	0.7	2	50	6
BBB2020	●	2	1	2	1.5	4	50	6

●: Line up

Tolerance (BBB2000)

R	R Tolerance	Tolerance on shank
0.3 ~ 1	±0.005	h6

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hard-ness	No. of revolutions n (min^{-1})	Ball radius (R) 0.3 Depth of cut ap × pf (mm)	0.3 Feed rate (mm/min)	0.4 Depth of cut ap × pf (mm)	0.4 Feed rate (mm/min)	0.5 Depth of cut ap × pf (mm)	0.5 Feed rate (mm/min)	1 Depth of cut ap × pf (mm)	1 Feed rate (mm/min)
H	Prehardened steels (NAK80, etc.) Die steels (JIS SKD61, etc.)	~ 52 HRC	50,000	0.02 × 0.03	2,000	0.03 × 0.05	2,000	0.05 × 0.05	3,000	0.10 × 0.10	5,000
H	Die steels (JIS SKD11, DRM1 & 2, etc.)	~ 62 HRC	50,000	0.01 × 0.02	2,000	0.02 × 0.03	2,000	0.03 × 0.05	3,000	0.05 × 0.05	5,000
H	High speed steel and die steel (JIS SKH, DRM3, etc.)	~ 70 HRC	50,000	0.01 × 0.02	1,500	0.01 × 0.03	1,500	0.02 × 0.03	2,000	0.03 × 0.05	3,000

Notes:
- Depths of cut (*ap*) shown in the table are the allowable maximum values.
- Mist cooling or air blow is recommended.
- The maximum number of revolutions of the machine to be used is lower than 50,000 min^{-1}, the revolutions and feed rate should be modified at same rate.
- Use smallest possible overhang.

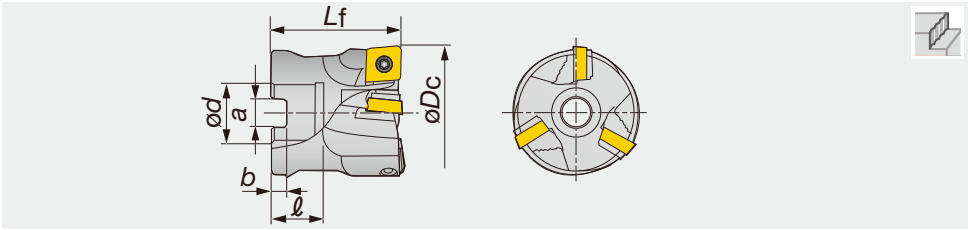
Ball radius (R)	Inclined angle of workpiece (θ1) / Effective neck length (Z)			
0.3	0°30′/1.25	1°/1.30	2°/1.35	3°/1.45
0.4	0°30′/1.65	1°/1.70	2°/1.80	3°/1.90
0.5	0°30′/2.05	1°/2.10	2°/2.25	3°/2.40
1	0°30′/4.15	1°/4.25	2°/4.50	3°/4.80

MEMO

TZP12

Plunging cutter for roughing operation with screw clamp

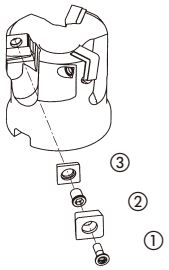
A.R. = +26°, R.R. = -2°



Designation	øDc	z	ød	ℓ	Lf	b	a	Kg	Insert
TZP12050R-E	50	3	22	20	50	6.3	10.4	0.38	APMT120416PR-MJ
TZP12063R-E	63	3	22	20	50	6.3	10.4	0.72	APMT120416PR-MJ

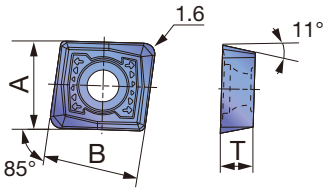
SPARE PARTS

Designation	①Clamping screw	Lubricant	②Shim screw	③Shim	Wrench (①)	Wrench 1 (②)
TZP12	CSTB-3.5T	M-1000	DTS5-3.5SS	ZSA1102	T-20D	P-3.5



INSERT

APMT120416-MJ



P	Steel	☆	★	
M	Stainless			
K	Cast iron	★		
N	Non-ferrous			
S	Superalloys			
H	Hard materials			

★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH120	Coated T3130	A	B	T
APMT120416PR-MJ	1.6	10	●	●	12.7	13.5	4.76

●: Line up

Profile Milling

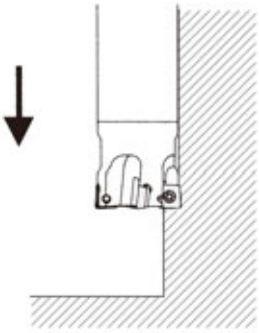
Reference pages

Standard cutting conditions → **D219**

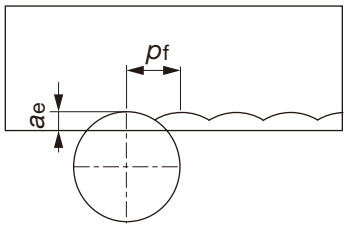
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels, Alloy steels	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Die steels < 300 HB	AH120	100 ~ 200	0.1 ~ 0.3
		T3130	150 ~ 250	0.1 ~ 0.25
	Prehardened steels < 45 HRC	AH120	60 ~ 120	0.1 ~ 0.2
K	Cast irons	AH120	100 ~ 200	0.1 ~ 0.3

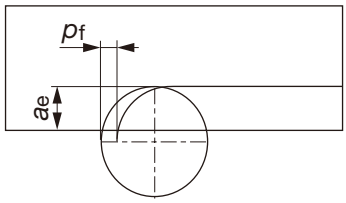
Z-feed milling



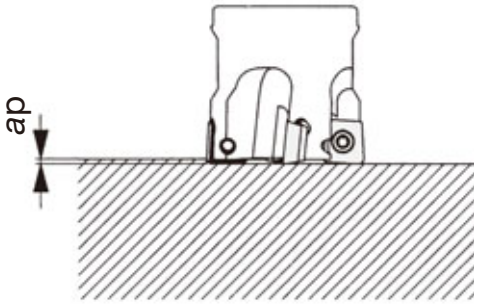
Machining method (1)



Machining method (2)



Traverse feed milling



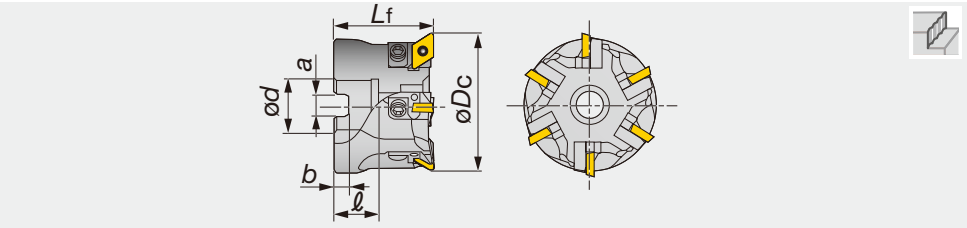
Machining method	Z-feed milling		Traverse feed milling
	Pick feed p_f (mm)	Radial depth of cut *ae* (mm)	Depth of cut *ap* (mm)
(1)	Tool dia. øD/2	Within effective cutting edge length	~ 0.5
(2)	Within effective cutting edge length	Tool dia. øD/2	

Note: In Z-feed milling, select either of the machining method (1) or (2) and decide the depth of cut according to the application.

TZF11

Plunging cutter for finishing operation

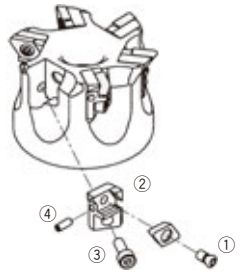
A.R. = 0°, R.R. = -6° ~ 0°



Designation	z	øDc	ød	ℓ	Lf	b	a	Kg	Insert
TZF11050R-E	4	50	22	20	45	6.3	10.4	0.38	DPCW11T3ZFR
TZF11063R-E	6	63	22	20	45	6.3	10.4	0.72	DPCW11T3ZFR

SPARE PARTS

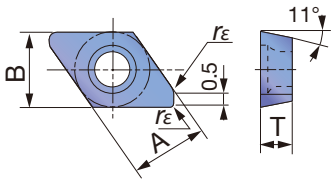
Designation	①Clamping screw	②Locator	Lubricant	③Cartridge fixing screw	④Cartridge fixing screw	Center bolt	Wrench (①)	Wrench 1 (④)	Wrench 2 (③)
TZF11050R*	CSTB-4S	SDUPR09CZ-11	M-1000	CM4X0.7X12	SSHM3-10	FSHM10-40	T-15D	P-1.5	P-3
TZF11063R*	CSTB-4S	SDUPR09CZ-11	M-1000	CM4X0.7X12	SSHM3-10	-	T-15D	P-1.5	P-3



INSERT

DPCW11T3

Precious ground insert for finishing with plunging tool



		Coated			Cermet	
P	Steel		☆		★	
M	Stainless					
K	Cast iron	★	☆			
N	Non-ferrous					
S	Superalloys					
H	Hard materials		☆			

★ : First choice
☆ : Second choice

Designation	rε	AH120	AH740		NS740		A	B	T
DPCW11T3ZFR	1	●	●		●		9.5	9.5	4

●: Line up

Reference pages

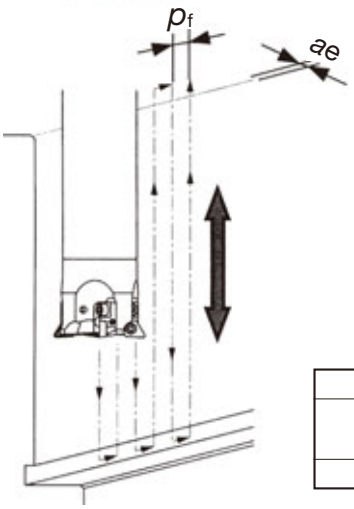
Standard cutting conditions → **D221**

STANDARD CUTTING CONDITIONS

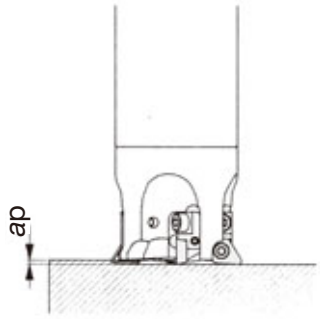
ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Carbon steels, Alloy steels < 300 HB	NS740	300 (150 ~ 400)	0.15 (0.05 ~ 0.2)
		AH740	250 (150 ~ 350)	0.15 (0.05 ~ 0.2)
K	Cast irons 250, etc.	AH120	300 (200 ~ 500)	0.15 (0.05 ~ 0.2)
	Ductile cast irons 600-3, etc.	AH740	250 (150 ~ 350)	0.15 (0.05 ~ 0.2)
H	Prehardened steels, Hard materials 40-55 HRC	AH740	150 (100 ~ 200)	0.1 (0.05 ~ 0.15)

- Dry cutting (or air blow) at a depth of cut up *ae* to 0.3 mm (allowable max. 0.5 mm) and a pick feed *pf* from 0.5 to 1.0 mm is recommended.
- TZF11 type cutters are not designed to adjust dynamic balance. Therefore, when the tool's overhang ratio (cutter diameter-to-length) exceeds 6:1, special care should be taken with the revolution speed. (At first, start the machining at 50 % of the speed shown in the table of the standard cutting conditions, and then gradually increase the speed whilst confirming safety.)
- To produce highly accurate surface finish, use the cutter on a machine with sufficient rigidity.

Z-feed milling



Traverse feed milling



Z-feed milling		Traverse feed milling
Pick feed *pf* (mm)	Radial depth of cut *ae* (mm)	Depth of cut *ap* (mm)
0.5 ~ 1	~ 0.5	~ 0.5

●Cautionary points in use

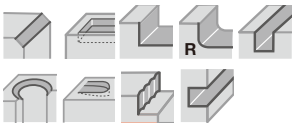
- Use the cutter for finish milling of vertical wall surfaces requiring long tool-overhang of L/D > 6.
- Radial cutting edge run-out should be adjusted within 0.01 mm.
- In addition to Z-feed milling, TZF11 type cutters can be also used for traverse feed milling. (*ap* ≤ 0.5 mm)

MillLine - Multi-Functional Milling

TUNGMEISTER

Endmills with exchangeable heads for reduced tool change time

ø6 mm - ø25 mm



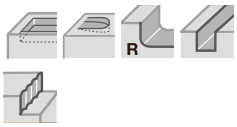
D224

P M K N S H

HYBRIDTACMILL

Multi-functional endmills

ø10 mm - ø16 mm / max. ap 8 mm



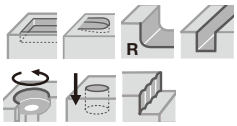
D252

P M K N

EVX

Multi-functional endmills in larger diameters

ø16 mm - ø63 mm / max. ap 15 mm



D255

P M K

ECC

Chamfering endmills for large lengths

ø34 mm - ø55 mm

D258

P M K

ECP

Chamfering endmills for small lengths

ø10 mm - ø36 mm

D260

P K

TCB

Counter boring tool for flat bottom finish

ø14 mm - ø43 mm

D261

P M K

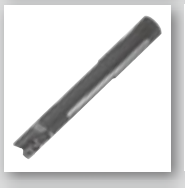
Thread Milling

Threading tool with a single indexable insert

M28 - M90

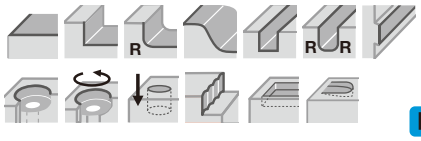
D263

P M



TMS

High rigidity modular system



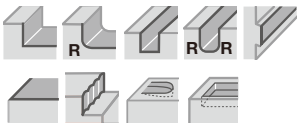
D265

P M K N H

Solid Endmill

Solid carbide endmills for various applications

ø0.4 mm - ø25 mm



D271

P M K N S H

TungMeister

Tungaloy **D223**

Mill Line

TUNGMEISTER

Designation system

Shank

V	SS	D10	L070	S	06	-	W	-	A
①	②	③	④	⑤	⑥		⑦		⑧

① Series	
V	TungMeister

② Shank type	
SS	Straight neck
TS	Taper neck
SC	Slotting
ST	for T-Slotting
AD	TungFlex adapter

③ Shank diameter (mm)	
D08	ø8
D10	ø10
D12	ø12
D16	ø16
D20	ø20
D25	ø25
D32	ø32
VSC, VAD type	
100	ø10
120	ø12
130	ø13
180	ø18
210	ø21

④ Length (mm)	
L070	70

⑤ Shape of shank	
S	Cylindrical
W	Weldon

⑥ Connection screw size	
05	S05
06	S06
08	S08
10	S10
12	S12
15	S15

⑦ Shank material	
S	Steel
C	Carbide
W	Tungsten

⑧ Additional feature	
A	with coolant hole
M	Thread size (TungFlex adapters)

Head

- **Square endmill**

V	E	E	080	L05.0	R00	-	03	S05
①	②	③	④	⑤	⑥	⑦	⑧	⑨

- **Ball nose endmill**

V	B	D	200	L15.0	-	BG	-	04	S12
①	②	③	④	⑤		⑥	⑦	⑧	⑨

① Series	
V	TungMeister

② Cutting edge	
E	Square
B	Ball
R	Radius
FX	for high feed
CA	for chamfering
CP	Spot drilling
CW	for chamfering (front and back)
CR	for R chamfering
GC	for counter boring
DP	for center drilling
S	for slotting
T	for T-slot milling

③ Helix angle / Rake face	
B	0°
C	15°
D	30°
E	38° ~ 50°
F	60°
T	Land

④ Diameter (mm)	
060	ø6
200	ø20

⑤ Cutting edge length (mm)	
Length	
L07.0	7
L15.0	15
Groove width	
W1.50	1.5
W1.57	1.57
W10.0	10

⑥ Corner shape / Angle	
Nose radius	
R00	Sharp edge
R005	R0.05
R01	R0.1
R05	R0.5
R10	R1.0
Chamfer type	
C15	0.15 x 45°
C30	0.3 x 45°
C60	0.6 x 45°
Chamfering head	
A30	30°
A60	60°
R chamfering head	
R10	R1.0
R16	R1.6
Ball nose	
SG	Sphere / high precision
BM	Ball / general purpose
BG	Ball / high precision

⑦ Additional feature	
I	Irregular pitch
A	for aluminium
R	for roughing
C	Combined edge

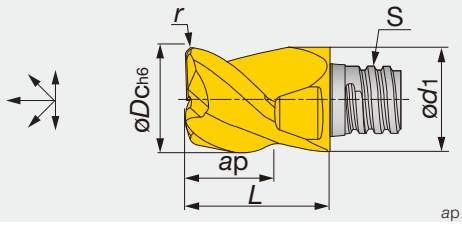
⑧ The number of flutes	
General	
02	2
06	6
Grooving head VST type	
3	3
4	4

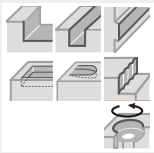
⑨ Connection screw size	
S05	S05
S06	S06
S08	S08
S10	S10
S12	S12
S15	S15

TUNGMEISTER

VEE**-03...

TungMeister square head with 3 flutes for general purpose





ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	r	S	L	Wrench	Torque*
VEE080L05.0R00-03S05	●	3	45°	8	7.7	5	-	S05	10	KEYV-S05	7
VEE100L07.0R00-03S06	●	3	45°	10	9.7	7	-	S06	13	KEYV-S06	10
VEE120L09.0R00-03S08	●	3	45°	12	11.70	9	-	S08	16.5	KEYV-S08	15

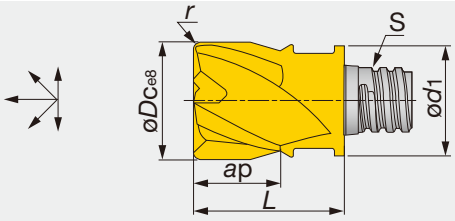
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

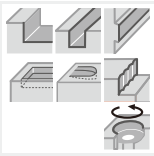
●: Line up

TUNGMEISTER

VED**-04..., VEE**-04...

TungMeister square head with 4 flutes for general purposes





ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	r	S	L	Wrench	Torque*
VEE060L05.0R00-04S05	●	4	45°	6	8	5	-	S05	10	KEYV-S05	7
VEE080L05.0R00-04S05	●	4	45°	8	7.7	5	-	S05	10	KEYV-S05	7
VED080L05.0R05-04S05	●	4	30°	8	7.7	5	0.5	S05	10	KEYV-S05	7
VED080L05.0R10-04S05	●	4	30°	8	7.7	5	1	S05	10	KEYV-S05	7
VED080L05.0R15-04S05	●	4	30°	8	7.7	5	1.5	S05	10	KEYV-S05	7
VEE100L07.0R00-04S06	●	4	45°	10	9.7	7	-	S06	13	KEYV-S06	10
VED100L07.0R05-04S06	●	4	30°	10	9.7	7	0.5	S06	13	KEYV-S06	10
VEE100L07.0R05-04S06	●	4	45°	10	9.7	7	0.5	S06	13	KEYV-S06	10
VED100L07.0R10-04S06	●	4	30°	10	9.7	7	1	S06	13	KEYV-S06	10
VEE100L07.0R10-04S06	●	4	45°	10	9.7	7	1	S06	13	KEYV-S06	10
VEE120L09.0R00-04S08	●	4	45°	12	11.7	9	-	S08	16.5	KEYV-S08	15
VED120L09.0R05-04S08	●	4	30°	12	11.7	9	0.5	S08	16.5	KEYV-S08	15
VEE120L09.0R05-04S08	●	4	45°	12	11.7	9	0.5	S08	16.5	KEYV-S08	15
VED120L09.0R10-04S08	●	4	30°	12	11.7	9	1	S08	16.5	KEYV-S08	15
VEE120L09.0R10-04S08	●	4	45°	12	11.7	9	1	S08	16.5	KEYV-S08	15
VEE160L12.0R00-04S10	●	4	45°	16	15.3	12	-	S10	20.5	KEYV-S10	28
VED160L12.0R05-04S10	●	4	30°	16	15.3	12	0.5	S10	20.5	KEYV-S10	28
VEE160L12.0R05-04S10	●	4	45°	16	15.3	12	0.5	S10	20.5	KEYV-S10	28
VED160L12.0R10-04S10	●	4	30°	16	15.3	12	1	S10	20.5	KEYV-S10	28
VEE160L12.0R10-04S10	●	4	45°	16	15.3	12	1	S10	20.5	KEYV-S10	28
VED160L12.0R15-04S10	●	4	30°	16	15.3	12	1.5	S10	20.5	KEYV-S10	28
VEE160L12.0R15-04S10	●	4	45°	16	15.3	12	1.5	S10	20.5	KEYV-S10	28
VED160L12.0R20-04S10	●	4	30°	16	15.3	12	2	S10	20.5	KEYV-S10	28
VEE160L12.0R20-04S10	●	4	45°	16	15.3	12	2	S10	20.5	KEYV-S10	28
VED160L12.0R30-04S10	●	4	30°	16	15.3	12	3	S10	20.5	KEYV-S10	28
VEE160L12.0R30-04S10	●	4	45°	16	15.3	12	3	S10	20.5	KEYV-S10	28
VED160L12.0R40-04S10	●	4	30°	16	15.3	12	4	S10	20.5	KEYV-S10	28
VEE160L12.0R40-04S10	●	4	45°	16	15.3	12	4	S10	20.5	KEYV-S10	28
VEE200L15.0R00-04S12	●	4	45°	20	18.3	15	-	S12	25.5	KEYV-S12	28
VED200L15.0R05-04S12	●	4	30°	20	18.3	15	0.5	S12	25.5	KEYV-S12	28
VED200L15.0R10-04S12	●	4	30°	20	18.3	15	1	S12	25.5	KEYV-S12	28
VED200L15.0R20-04S12	●	4	30°	20	18.3	15	2	S12	25.5	KEYV-S12	28
VED200L15.0R30-04S12	●	4	30°	20	18.3	15	3	S12	25.5	KEYV-S12	28

*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

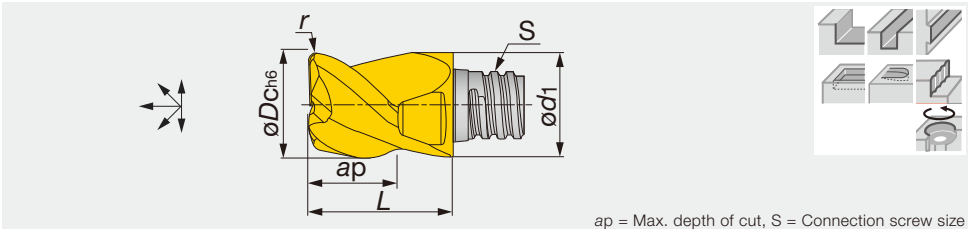
Reference pages

Standard cutting conditions → **D231 - D232**

TUNGMEISTER

VEE**-03...

TungMeister square head with 3 flutes for key way



Designation	AH725	z	Helx	øDc	ød1	Max. ap	r	S	L	Wrench	Torque*
VEE077L04.0R02-03S05	●	3	38°	7.7	7.7	4	0.2	S05	10	KEYV-S05	7
VEE097L05.0R03-03S06	●	3	38°	9.7	9.7	5	0.3	S06	13	KEYV-S06	10
VEE117L07.0R03-03S08	●	3	38°	11.7	11.7	7	0.3	S08	16.5	KEYV-S08	15
VEE157L08.0R03-03S10	●	3	38°	15.7	15.3	8	0.3	S10	20.5	KEYV-S10	28
VEE197L12.0R04-03S12	●	3	38°	19.7	18.3	12	0.4	S12	25.5	KEYV-S12	28

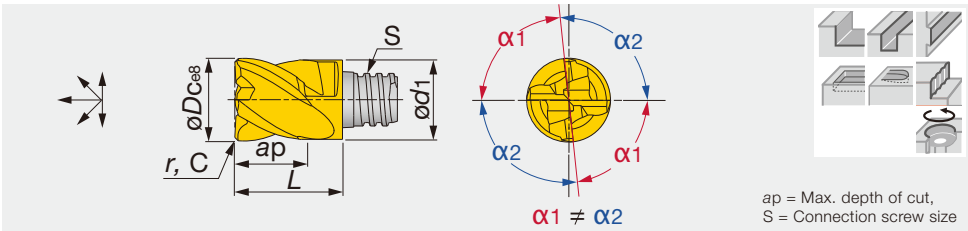
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VEE**I...

TungMeister square head with irregular pitch flute for chatter free cutting



Designation	AH725	z	Helx	øDc	ød1	Max. ap	r	C	S	L	Wrench	Torque*
VEE080L05.0C30I04S05	●	4	38°	8	7.7	5	-	0.3	S05	10	KEYV-S05	7
VEE100L07.0C40I04S06	●	4	38°	10	9.7	7	-	0.4	S06	13	KEYV-S06	10
VEE120L09.0C50I04S08	●	4	38°	12	11.7	9	-	0.5	S08	16.5	KEYV-S08	15
VEE160L12.0C60I04S10	●	4	38°	16	15.3	12	-	0.6	S10	20.5	KEYV-S10	28
VEE200L15.0C60I04S12	●	4	38°	20	18.3	15	-	0.6	S12	25.5	KEYV-S12	28
VEE250L22.0C60I04S15	●	4	38°	25	23.9	22	-	0.6	S15	37	KEYV-W20	40
VEE250L22.0R00I04S15	●	4	38°	25	23.9	22	-	-	S15	37	KEYV-W20	40
VEE250L22.0R05I04S15	●	4	38°	25	23.9	22	0.5	-	S15	37	KEYV-W20	40
VEE250L22.0R10I04S15	●	4	38°	25	23.9	22	1	-	S15	37	KEYV-W20	40
VEE250L22.0R20I04S15	●	4	38°	25	23.9	22	2	-	S15	37	KEYV-W20	40
VEE250L22.0R30I04S15	●	4	38°	25	23.9	22	3	-	S15	37	KEYV-W20	40

*Torque: Recommended torque (N·m) for clamping.
VEE080 ~ VEE200: Packing quantity = 2 pcs.
VEE250: Packing quantity = 1pc.

●: Line up

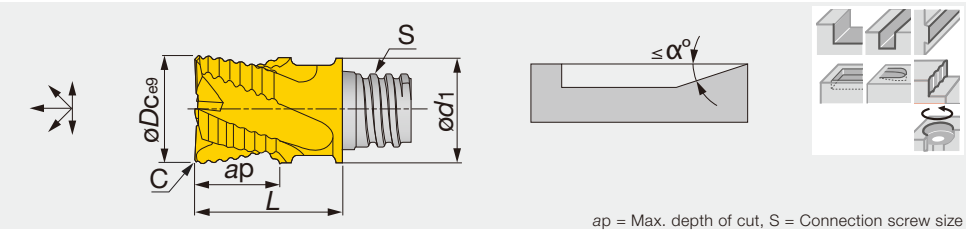
Reference pages

Standard cutting conditions → **D231 - D232**

TUNGMEISTER

VEE**R...

TungMeister square head with serated edges for roughing



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	C	S	L	α°	Wrench	Torque*
VEE080L05.0C25R04S05	●	4	45°	8	7.7	5	0.25	S05	10	90	KEYV-S05	7
VEE100L07.0C30R04S06	●	4	45°	10	9.7	7	0.3	S06	13	90	KEYV-S06	10
VEE120L09.0C35R04S08	●	4	45°	12	11.7	9	0.35	S08	16.5	90	KEYV-S08	15
VEE160L12.0C40R05S10	●	5	45°	16	15.3	12	0.4	S10	20.5	7	KEYV-S10	28
VEE200L15.0C40R06S12	●	6	45°	20	18.3	15	0.4	S12	25.5	3	KEYV-S12	28
VEE250L22.0C50R06S15	●	6	45°	25	23.9	22	0.5	S15	37	3	KEYV-W20	40

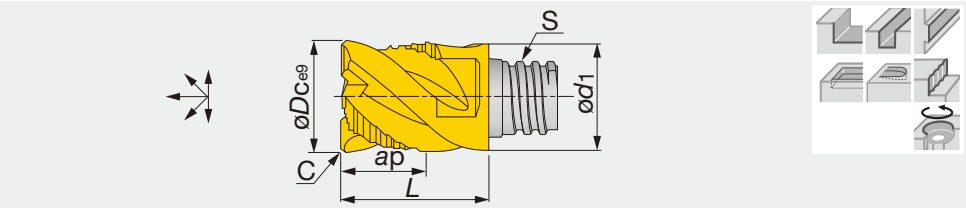
*Torque: Recommended torque (N·m) for clamping.
VEE080 ~ VEE200: Packing quantity = 2 pcs.
VEE250: Packing quantity = 1pc.

●: Line up

TUNGMEISTER

VEE**C...

TungMeister square head with combined edges of finish and serated



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	C	S	L	Wrench	Torque*
VEE080L05.0C30C04S05	●	4	45°	8	7.7	5	0.3	S05	10	KEYV-S05	7
VEE100L07.0C30C04S06	●	4	45°	10	9.7	7	0.3	S06	13	KEYV-S06	10
VEE120L09.0C40C04S08	●	4	45°	12	11.7	9	0.4	S08	16.5	KEYV-S08	15
VEE160L12.0C60C04S10	●	4	45°	16	15.3	12	0.6	S10	20.5	KEYV-S10	28
VEE200L15.0C60C04S12	●	4	45°	20	18.3	15	0.6	S12	25.5	KEYV-S12	28
VEE250L22.0C60C04S15	●	4	45°	25	23.9	22	0.6	S15	37	KEYV-W20	40

*Torque: Recommended torque (N·m) for clamping.
VEE080 ~ VEE200: Packing quantity = 2 pcs.
VEE250: Packing quantity = 1pc.

●: Line up

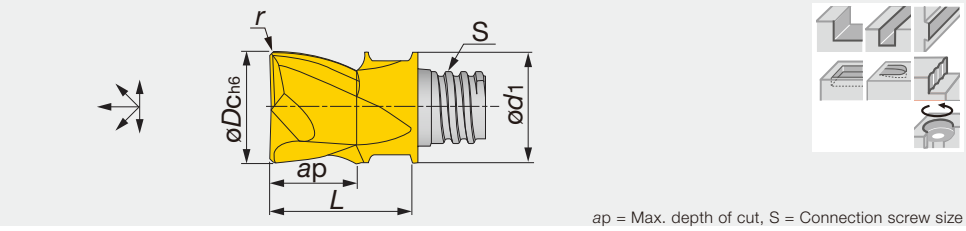
Reference pages

Standard cutting conditions → **D231 - D232**

TUNGMEISTER

VEE**A02...

TungMeister square head with 2 flutes for aluminium machining



Designation	KS15F	z	Helx	øDc	ød1	Max. ap	r	S	L	Wrench	Torque*
VEE100L07.0R05A02S06	●	2	45°	10	9.7	7	0.5	S06	13	KEYV-S06	10
VEE100L07.0R10A02S06	●	2	45°	10	9.7	7	1	S06	13	KEYV-S06	10
VEE120L09.0R05A02S08	●	2	45°	12	11.7	9	0.5	S08	16.5	KEYV-S08	15

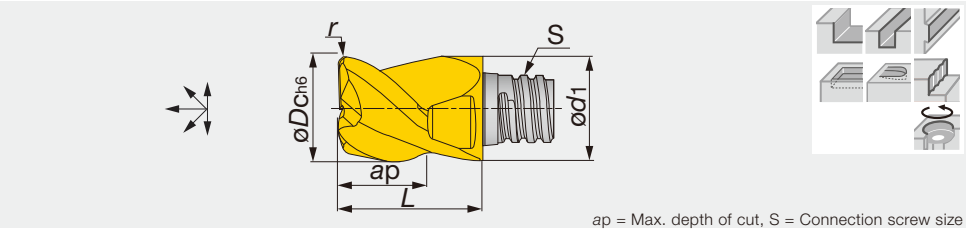
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VEE**A03...

TungMeister square head with 3 flutes for aluminium machining



Designation	KS15F	z	Helx	øDc	ød1	Max. ap	r	S	L	Wrench	Torque*
VEE080L05.0R05A03S05	●	3	45°	8	7.7	5	0.5	S05	10	KEYV-S05	7
VEE100L06.0R05A03S06	●	3	45°	10	9.7	6	0.5	S06	13	KEYV-S06	10
VEE100L06.0R10A03S06	●	3	45°	10	9.7	6	1	S06	13	KEYV-S06	10
VEE120L08.0R05A03S08	●	3	45°	12	11.7	8	0.5	S08	16.5	KEYV-S08	15
VEE120L08.0R10A03S08	●	3	45°	12	11.7	8	1	S08	16.5	KEYV-S08	15
VEE160L10.0R00A03S10	●	3	45°	16	15.3	10	-	S10	20.5	KEYV-S10	28
VEE160L10.0R10A03S10	●	3	45°	16	15.3	10	1	S10	20.5	KEYV-S10	28
VEE160L10.0R20A03S10	●	3	45°	16	15.3	10	2	S10	20.5	KEYV-S10	28
VEE200L12.0R05A03S12	●	3	45°	20	18.3	12	0.5	S12	25.5	KEYV-S12	28
VEE200L12.0R10A03S12	●	3	45°	20	18.3	12	1	S12	25.5	KEYV-S12	28
VEE200L12.0R20A03S12	●	3	45°	20	18.3	12	2	S12	25.5	KEYV-S12	28

*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

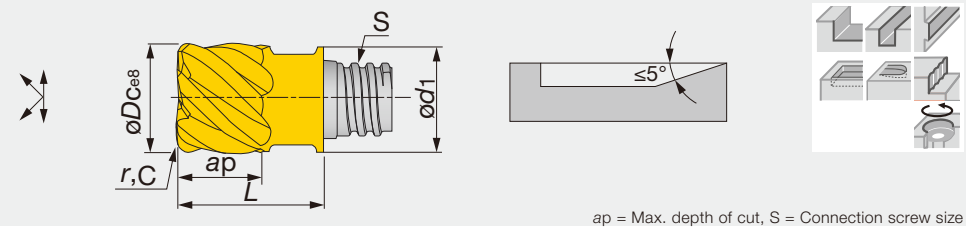
Reference pages

Standard cutting conditions → **D231 - D232**

TUNGMEISTER

VED**-06..., VEE**-06...

TungMeister square head with 6 flutes for difficult-to-cut material machining



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	AH750	z	Helx	øDc	ød1	Max. ap	r	C	S	L	Wrench	Torque*
VEE080L05.0R05-06S05	●		6	45°	8	7.7	5	0.5	-	S05	10	KEYV-S05	7
VEE080L05.0R10-06S05	●		6	45°	8	7.7	5	1	-	S05	10	KEYV-S05	7
VEE080L05.0R15-06S05	●		6	45°	8	7.7	5	1.5	-	S05	10	KEYV-S05	7
VEE080L05.0C10-06S05		●	6	50°	8	7.7	5	-	0.1	S05	10	KEYV-S05	7
VEE100L07.0R00-06S06	●		6	45°	10	9.7	7	-	-	S06	13	KEYV-S06	10
VED100L07.0R05-06S06	●		6	30°	10	9.7	7	0.5	-	S06	13	KEYV-S06	10
VEE100L07.0R05-06S06	●		6	45°	10	9.7	7	0.5	-	S06	13	KEYV-S06	10
VED100L07.0R10-06S06	●		6	30°	10	9.7	7	1	-	S06	13	KEYV-S06	10
VEE100L07.0R10-06S06	●		6	45°	10	9.7	7	1	-	S06	13	KEYV-S06	10
VED100L07.0R15-06S06	●		6	30°	10	9.7	7	1.5	-	S06	13	KEYV-S06	10
VEE100L07.0R15-06S06	●		6	45°	10	9.7	7	1.5	-	S06	13	KEYV-S06	10
VEE100L07.0C10-06S06		●	6	50°	10	9.7	7	-	0.1	S06	13	KEYV-S06	10
VEE120L09.0R00-06S08	●		6	45°	12	11.7	9	-	-	S08	16.5	KEYV-S08	15
VED120L09.0R05-06S08	●		6	30°	12	11.7	9	0.5	-	S08	16.5	KEYV-S08	15
VED120L09.0R10-06S08	●		6	30°	12	11.7	9	1	-	S08	16.5	KEYV-S08	15
VEE120L09.0R10-06S08	●		6	45°	12	11.7	9	1	-	S08	16.5	KEYV-S08	15
VEE120L09.0R15-06S08	●		6	45°	12	11.7	9	1.5	-	S08	16.5	KEYV-S08	15
VEE120L09.0C10-06S08		●	6	50°	12	11.7	9	-	0.1	S08	16.5	KEYV-S08	15

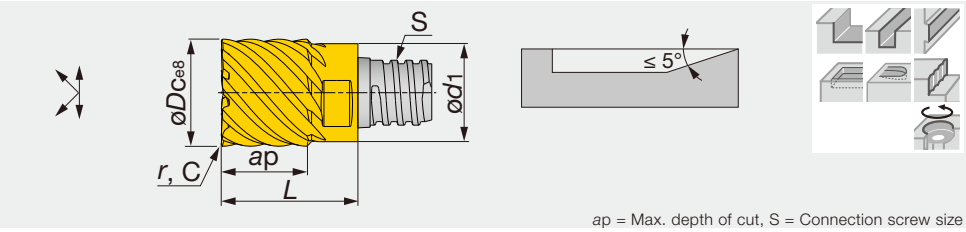
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VED**-08,10..., VEE**-08,10...

TungMeister square head with 8, 10 flutes for difficult-to-cut material machining



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	AH750	z	Helx	øDc	ød1	Max. ap	r	C	S	L	Wrench	Torque*
VED160L12.0R05-08S10	●		8	30°	16	15.3	12	0.5	-	S10	20.5	KEYV-S10	28
VED160L12.0R10-08S10	●		8	30°	16	15.3	12	1	-	S10	20.5	KEYV-S10	28
VED160L12.0R16-08S10	●		8	30°	16	15.3	12	1.6	-	S10	20.5	KEYV-S10	28
VED160L12.0R20-08S10	●		8	30°	16	15.3	12	2	-	S10	20.5	KEYV-S10	28
VEE160L12.0C20-08S10		●	8	50°	16	15.3	12	-	0.2	S10	20.5	KEYV-S10	28
VED200L15.0R10-10S12	●		10	30°	20	18.3	15	1	-	S12	25.5	KEYV-S12	28
VED200L15.0R20-10S12	●		10	30°	20	18.3	15	2	-	S12	25.5	KEYV-S12	28
VEE200L15.0C20-10S12		●	10	50°	20	18.3	15	-	0.2	S12	25.5	KEYV-S12	28
VED250L22.0R10-10S15	●		10	30°	25	23.9	22	1	-	S15	37	KEYV-W20	40
VED250L22.0R20-10S15	●		10	30°	25	23.9	22	2	-	S15	37	KEYV-W20	40

*Torque: Recommended torque (N·m) for clamping.
VEE / VED160 - 200: Packing quantity = 2 pcs.
VED250: Packing quantity = 1pc.

●: Line up

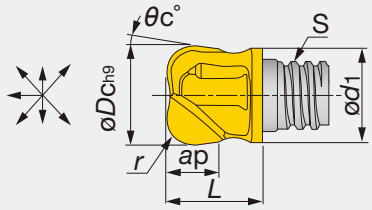
Reference pages

Standard cutting conditions → **D231 - D232**

TUNGMEISTER

VRB**-02...,VRC**-02...

TungMeister radius head with 2 pressed flutes



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	r	θc°	S	L	Wrench	Torque*
VRC100L07.0R05-02S06	●	2	15°	10	9.5	7	0.5	5	S06	12.4	KEYV-S06	10
VRC100L07.0R10-02S06	●	2	15°	10	9.5	7	1	5	S06	12.4	KEYV-S06	10
VRB100L06.0R20-02S06	●	2	0°	10	9.2	6	2	7	S06	12.4	KEYV-S06	10
VRB120L05.7R30-02S06	●	2	0°	12	9.5	5.7	3	7	S06	9.1	**KEYV-S08	10
VRB120L05.4R40-02S06	●	2	0°	12	9.5	5.4	4	7	S06	9.1	**KEYV-S08	10
VRB120L06.3R16-02S08	●	2	0°	12	11.5	5.9	1.6	7	S08	11.1	KEYV-S08	15
VRB120L06.2R20-02S08	●	2	0°	12	11.5	6.2	2	7	S08	11.1	KEYV-S08	15
VRB120L06.1R25-02S08	●	2	0°	12	11.5	5.8	2.5	7	S08	11.1	KEYV-S08	15
VRB120L06.1R30-02S08	●	2	0°	12	11.5	5.7	3	7	S08	11.1	KEYV-S08	15
VRB120L05.9R40-02S08	●	2	0°	12	11.5	5.5	4	7	S08	11.1	KEYV-S08	15
VRB160L08.0R50-02S10	●	2	0°	16	15.2	8	5	7	S10	20.2	KEYV-S10	28
VRB200L11.1R30-02S12	●	2	0°	20	18.3	11	3	7	S12	17	KEYV-S12	28
VRB200L11.5R40-02S12	●	2	0°	20	18.3	11.3	4	7	S12	17.3	KEYV-S12	28
VRB200L11.5R50-02S12	●	2	0°	20	18.3	11.3	5	7	S12	17.3	KEYV-S12	28
VRB200L11.4R60-02S12	●	2	0°	20	18.3	11.2	6	7	S12	17.3	KEYV-S12	28
VRB200L11.3R80-02S12	●	2	0°	20	18.3	11.1	8	7	S12	17.3	KEYV-S12	28

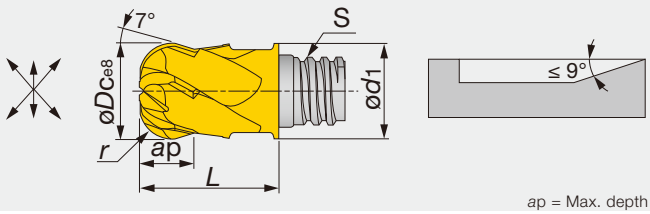
Note: Suitable for contouring operation. Some heads require different wrench sizes.
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VRD**-06...

TungMeister radius head with 6 ground flutes



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	r	S	L	Wrench	Torque*
VRD080L04.0R20-06S05	●	6	30°	8	7.7	4	2	S05	10	KEYV-S05	7
VRD100L05.0R30-06S06	●	6	30°	10	9.7	5	3	S06	13	KEYV-S06	10
VRD120L07.0R40-06S08	●	6	30°	12	11.7	7	4	S08	16.5	KEYV-S08	15
VRD160L09.0R50-06S10	●	6	30°	16	15.3	9	5	S10	20.5	KEYV-S10	28

*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

Reference pages

Standard cutting conditions → **D231 - D232**

STANDARD CUTTING CONDITIONS

Shoulder milling (VEE: 3 flutes, VED/VEE: 4 flutes, VEE-A, VEE-I, VEE-R, VEE-C, VRB, VRC, VRD)

ISO	Workpiece material	Hard-ness	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool diameter: *øDc* (mm) 6	8	10	12	16	20	25	Depth of cut *ap* (mm)	Pick feed *Pf* (mm)
P	Low carbon steels C45, C55, etc.	- 300 HB	80 - 180	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.25 x *øDc*
P	High carbon steels 42CrMo4, 15Cr3, etc.	- 300 HB	60 - 140	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.25 x *øDc*
P	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	60 - 120	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.25 x *øDc*
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200 HB	40 - 100	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.25 x *øDc*
K	Grey cast irons 250, 300, etc.	150 - 250 HB	80 - 200	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.25 x *øDc*
K	Ductile cast irons 400-15S, etc.	150 - 250 HB	80 - 200	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *Dc*	0.25 x *øDc*
N	Aluminium alloys Si < 13%	-	200 - 700	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.25 x *øDc*
N	Aluminium alloys Si ≥13%	-	100 - 300	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.25 x *øDc*
S	Titanium alloys Ti-6Al-4V, etc.	-	40 - 80	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.05 x *øDc*
S	Heat-resistant alloys Inconel 718, etc.	-	20 - 40	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.10 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.05 x *øDc*
H	Hardened steel X40CrMoV5 1, 55NiCrMoV6, etc.	40 - 50 HRC	40 - 80	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.05 x *øDc*
H	Hardened steel X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	20 - 60	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x *øDc*	0.05 x *øDc*

Slot milling (VEE: 3 flutes, VED/VEE: 4 flutes, VEE-A, VEE-I, VEE-R, VEE-C, VRB, VRC, VRD)

ISO	Workpiece material	Hardness	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool diameter: *øDc* (mm) 6	8	10	12	16	20	25	Depth of cut *ap* (mm)
P	Low carbon steels C45, C55, etc.	- 300 HB	80 - 180	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
P	High carbon steels 42CrMo4, 15Cr3, etc.	- 300 HB	60 - 140	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
P	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	60 - 120	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200 HB	40 - 100	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
K	Grey cast irons 250, 300, etc.	150 - 250 HB	80 - 200	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
K	Ductile cast irons 400-15S, etc.	150 - 250 HB	80 - 200	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.10	0.5 x *øDc*
N	Aluminium alloys Si < 13%	-	200 - 700	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
N	Aluminium alloys Si ≥13%	-	100 - 300	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
S	Titanium alloys Ti-6Al-4V, etc.	-	40 - 80	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
S	Heat-resistant alloys Inconel 718, etc.	-	20 - 40	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.5 x *øDc*
H	Hardened steel X40CrMoV5 1, 55NiCrMoV6, etc.	40 - 50 HRC	40 - 80	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.2 x *øDc*
H	Hardened steel X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	20 - 60	0.03 - 0.07	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.07 - 0.1	0.2 x *øDc*

STANDARD CUTTING CONDITIONS

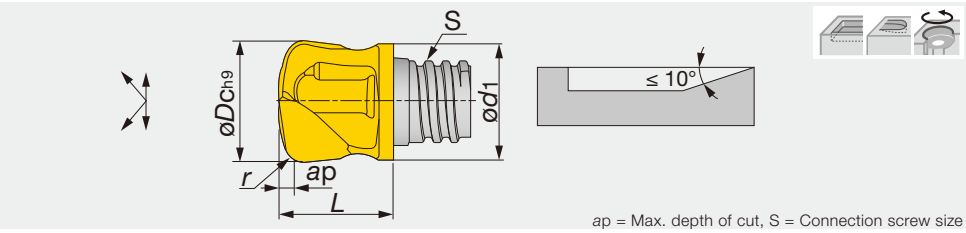
Shoulder milling (VED / VEE: 6 flutes, VED / VEE: 8, 10 flutes)

ISO	Workpiece material	Hard-ness	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool diameter: ø*Dc* (mm) 8	10	12	16	20	25	Depth of cut *ap* (mm)	Pick feed *Pf* (mm)
S	Titanium alloys Ti-6Al-4V, etc.	-	60 - 120	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x ø*Dc*	0.02 x ø*Dc*
	Heat-resistant alloys Inconel 718, etc.	-	30 - 60	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x ø*Dc*	0.02 x ø*Dc*
H	Hardened steel X40CrMoV5 1, 55NiCrMoV6, etc.	40 - 50 HRC	80 - 160	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x ø*Dc*	0.02 x ø*Dc*
	Hardened steel X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	40 - 90	0.05 - 0.09	0.07 - 0.12	0.08 - 0.13	0.09 - 0.15	0.1 - 0.17	0.1 - 0.17	0.6 x ø*Dc*	0.02 x ø*Dc*

TUNGMEISTER

VFX**-02...

TungMeister radius head for super high-feed milling



Designation	AH725	z	Helx	øDc	ød1	Max. ap	r(1)	S	L	Wrench	Torque*
VFX100L00.6R20-02S06	●	2	0°	10	9.6	0.6	2	S06	12.5	KEYV-S06	10
VFX120L01.0R25-02S08	●	2	0°	12	11.5	1.0	2.5	S08	11.1	KEYV-S08	15
VFX160L01.1R30-02S10	●	2	0°	16	15.2	1.1	3	S10	20	KEYV-S10	28
VFX200L01.5R33-02S12	●	2	0°	20	18.3	1.5	3.3	S12	17.5	KEYV-S12	28

●: Line up

(1) Corner radius for CAM programing
Note: For VFX head, taper neck shank or Tungsten shank should be recommended.
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

STANDARD CUTTING CONDITIONS

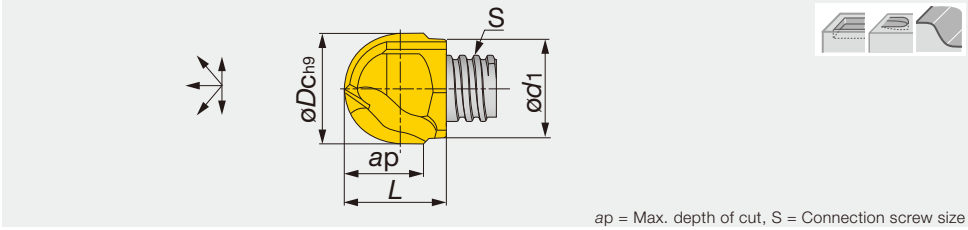
High feed milling (VFX)

ISO	Workpiece material	Hardness	Cutting speed Vc (m/min)	ø10a Feed per tooth fz (mm/t)	ø10a Depth of cut ap (mm)	ø12 Feed per tooth fz (mm/t)	ø12 Depth of cut ap (mm)	ø16 Feed per tooth fz (mm/t)	ø16 Depth of cut ap (mm)	ø20 Feed per tooth fz (mm/t)	ø20 Depth of cut ap (mm)	Width of cut ae (mm)
P	Low carbon steels C45, C55, etc.	- 300 HB	100 - 200	0.3 - 0.7	0.5	0.4 - 0.8	0.5	0.5 - 0.9	0.75	0.6 - 1	1	0.6 x øDc
	High carbon steels 42CrMo4, 15Cr3, etc.	- 300 HB	80 - 180	0.2 - 0.6	0.5	0.3 - 0.7	0.5	0.4 - 0.8	0.75	0.5 - 0.9	1	0.6 x øDc
	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	80 - 160	0.2 - 0.5	0.4	0.2 - 0.5	0.4	0.3 - 0.6	0.5	0.3 - 0.6	0.75	0.6 x øDc
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200 HB	60 - 100	0.2 - 0.6	0.4	0.2 - 0.6	0.4	0.3 - 0.7	0.5	0.3 - 0.7	0.75	0.6 x øDc
K	Grey cast irons 250, 300, etc.	150 - 250 HB	100 - 220	0.3 - 0.7	0.5	0.4 - 0.8	0.75	0.5 - 0.9	0.75	0.6 - 1	1	0.6 x øDc
	Ductile cast irons 400-15S, etc.	150 - 250 HB	100 - 220	0.2 - 0.6	0.5	0.3 - 0.7	0.75	0.4 - 0.8	0.75	0.5 - 0.9	1	0.6 x øDc
S	Titanium alloys Ti-6Al-4V, etc.	-	40 - 80	0.2 - 0.5	0.4	0.2 - 0.5	0.4	0.2 - 0.6	0.5	0.2 - 0.6	0.5	0.25 x øDc
	Heat-resistant alloys Inconel 718, etc.	-	20 - 40	0.1 - 0.3	0.3	0.1 - 0.3	0.3	0.1 - 0.3	0.4	0.1 - 0.3	0.4	0.25 x øDc
H	Hardened steel X40CrMoV5 1, 55NiCrMoV6, etc.	40 - 50 HRC	40 - 80	0.2 - 0.4	0.3	0.2 - 0.4	0.3	0.3 - 0.5	0.4	0.3 - 0.5	0.4	0.45 x øDc
	Hardened steel X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	20 - 60	0.1 - 0.2	0.2	0.1 - 0.2	0.2	0.1 - 0.3	0.3	0.1 - 0.3	0.3	0.25 x øDc

TUNGMEISTER

VBB**-BM...

TungMeister ball nose head with pressed edge for roughing



Designation	AH725	z	Helx	øDc	ød1	Max. ap	S	L	Wrench	Torque*
VBB080L08.0-BM-02S05	●	2	0°	8	7.6	8	S05	10	KEYV-S05	7
VBB100L10.0-BM-02S06	●	2	0°	10	9.5	10	S06	12.4	KEYV-S06	10
VBB120L12.0-BM-02S08	●	2	0°	12	11.5	11.5	S08	15.3	KEYV-S08	15
VBB160L16.0-BM-02S10	●	2	0°	16	15.2	16	S10	19.1	KEYV-S10	28

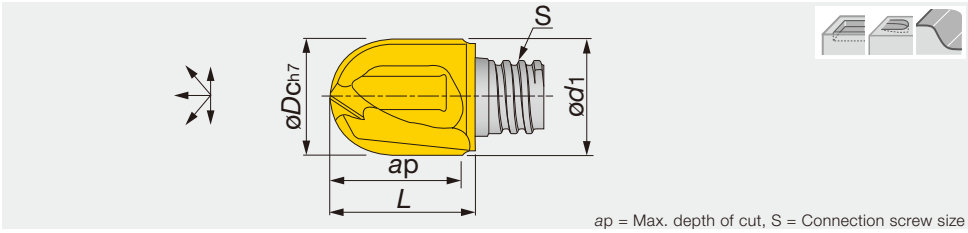
• For roughing
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VBB**-BG...

TungMeister ball nose head with ground edge for semi-finishing



Designation	AH750	z	Helx	øDc	ød1	Max. ap	S	L	Wrench	Torque*
VBB080L08.0-BG-02S05	●	2	0°	8	7.6	8	S05	10	KEYV-S05	7
VBB100L10.0-BG-02S06	●	2	0°	10	9.6	10	S06	12.4	KEYV-S06	10
VBB120L12.0-BG-02S08	●	2	0°	12	11.5	12	S08	15.3	KEYV-S08	15
VBB160L16.0-BG-02S10	●	2	0°	16	15.2	16	S10	19.1	KEYV-S10	28

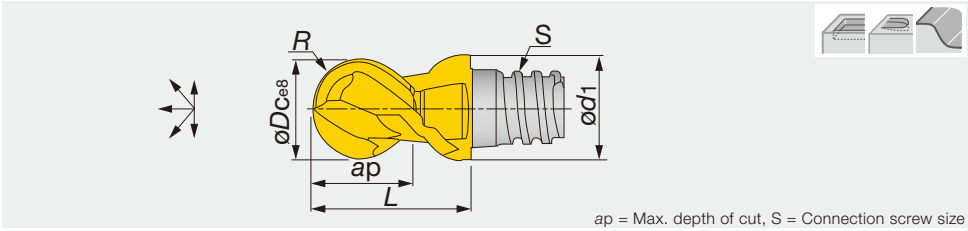
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VBD**-BG...

TungMeister ball nose head with 2 flutes and helical ground edge for finishing



Designation	AH725	z	Helx	øDc	ød1	Max. ap	R	S	L	Wrench	Torque*
VBD080L05.0-BG-02S05	●	2	30°	8	7.7	5	3.982(1)	S05	10	KEYV-S05	7
VBD100L07.0-BG-02S06	●	2	30°	10	9.7	7	4.982(1)	S06	13.0	KEYV-S06	10
VBD120L09.0-BG-02S08	●	2	30°	12	11.7	9	5.978(2)	S08	16.5	KEYV-S08	15
VBD160L09.5-BG-02S10	●	2	30°	16	15.3	9	7.978(2)	S10	20.5	KEYV-S10	28

• The tolerance of R : (1) ± 0.01 (2) ± 0.012
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

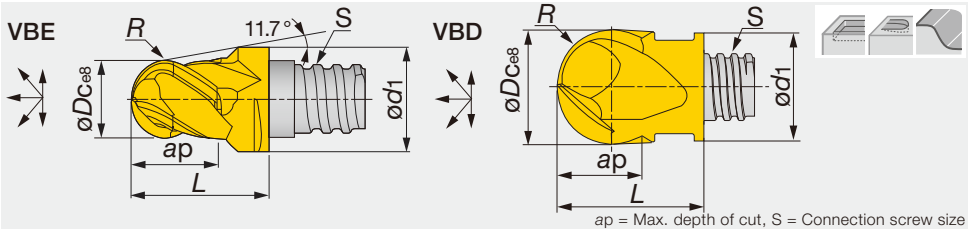
Reference pages

Standard cutting conditions → **D236**

TUNGMEISTER

VBD**-BG..., VBE**-BG...

TungMeister ball nose head with 4 flutes and helical ground edge for finishing



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	R	S	L	Wrench	Torque*
VBE060L05.5-BG-04S05	●	4	38°	6	8	5.5	2.987(1)	S05	10	KEYV-S05	7
VBD080L05.0-BG-04S05	●	4	30°	8	7.7	5	3.982(1)	S05	10	KEYV-S05	7
VBD100L07.0-BG-04S06	●	4	30°	10	9.7	7	4.982(1)	S06	13	KEYV-S06	10
VBD120L09.0-BG-04S08	●	4	30°	12	11.7	9	5.978(2)	S08	16.5	KEYV-S08	15
VBD160L12.0-BG-04S10	●	4	30°	16	15.3	12	7.978(2)	S10	20.5	KEYV-S10	28
VBD200L15.0-BG-04S12	●	4	30°	20	18.3	15	9.972(2)	S12	25.5	KEYV-S12	28
VBD250L22.0-BG-04S15	●	4	30°	25	23.9	22	12.470(3)	S15	37	KEYV-W20	40

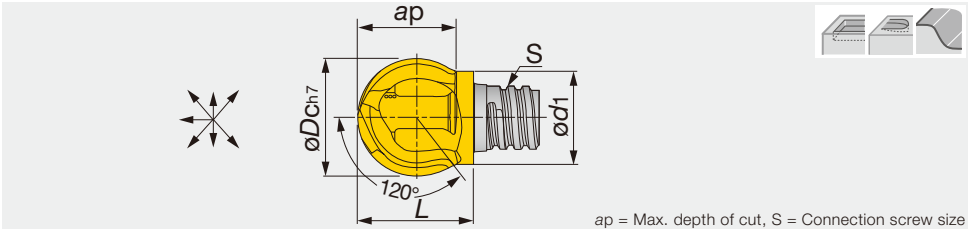
• The tolerance of R : (1) ± 0.01 (2) ± 0.012 (3) ± 0.02
*Torque: Recommended torque (N·m) for clamping.
VBE060/VBD080 ~ VBD200: Packing quantity = 2 pcs.
VBD250: Packing quantity = 1pc.

●: Line up

TUNGMEISTER

VBB**-SG...

TungMeister ball nose head with spherical designed edge,available for pull-cutting on the wall



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	S	L	Wrench	Torque**
VBB100L08.0-SG-02S05	●	2	0°	10	7.6	7.5	S05	10	KEYV-S05	7
VBB120L09.6-SG-02S06	●	2	0°	12	9.5	9	S06	11.6	*KEYV-S08	10
VBB160L12.9-SG-02S08	●	2	0°	16	12.2	12	S08	15.4	*KEYV-S10	15
VBB200L16.1-SG-02S10	●	2	0°	20	15.2	15	S10	18.4	KEYV-S10	28

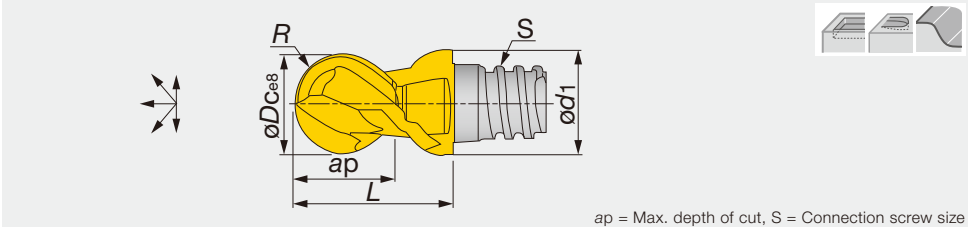
• For pull-cutting on the vertical wall
* Some heads require different size of wrench.
**Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VBE**-BGA...

TungMeister ball nose head with 2 flutes and helical ground edge for Al machining



ap = Max. depth of cut, S = Connection screw size

Designation	KS15F	z	Helx	øDc	ød1	Max. ap	R	S	L	Wrench	Torque*
VBE080L05.0-BGA02S05	●	2	45°	8	7.7	5	3.982(1)	S05	10	KEYV-S05	7
VBE100L07.0-BGA02S06	●	2	45°	10	9.7	7	4.982(1)	S06	13	KEYV-S06	10
VBE120L09.0-BGA02S08	●	2	45°	12	11.7	9	5.987(2)	S08	16.5	KEYV-S08	15
VBE160L12.0-BGA02S10	●	2	45°	16	15.3	12	7.978(2)	S10	20.5	KEYV-S10	28
VBE200L15.0-BGA02S12	●	2	45°	20	18.3	15	9.972(2)	S12	25.5	KEYV-S12	28

• The tolerance of R : (1) ± 0.01 (2) ± 0.012
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

Reference pages

Standard cutting conditions → **D236**

STANDARD CUTTING CONDITIONS

Standard cutting conditions: Profiling for roughing (VBB-BM / BG / SG, VBD-BG, VBE-BGA)

ISO	Workpiece material	Hard-ness	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool diameter: *øDc* (mm) 6	8	10	12	16	20	25	Depth of cut *ap* (mm)	Pick feed *Pf* (mm)
P	Low carbon steels C45, C55, etc.	- 300 HB	100 - 200	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.4 x *øDc*
P	High carbon steels 42CrMo4, 15Cr3, etc.	- 300 HB	80 - 180	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.4 x *øDc*
P	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	80 - 160	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.4 x *øDc*
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200 HB	60 - 100	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.4 x *øDc*
K	Grey cast irons 250, 300, etc.	150 - 250 HB	100 - 220	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.4 x *øDc*
K	Ductile cast irons 400-15S, etc.	150 - 250 HB	100 - 220	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.4 x *øDc*
N	Aluminium alloys Si < 13%	-	200 - 700	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.4 x *øDc*
N	Aluminium alloys Si ≥13%	-	100 - 300	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.4 x *øDc*
S	Titanium alloys Ti-6Al-4V, etc.	-	40 - 80	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.2 x *øDc*
S	Heat-resistant alloys Inconel 718, etc.	50 - 60 HRC	20 - 40	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.2 x *øDc*
H	Hardened steel X40CrMoV5 1, 55NiCrMoV6, etc.	-	40 - 80	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.2 x *øDc*
H	Hardened steel X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	20 - 60	0.03 - 0.07	0.04 - 0.08	0.05 - 0.10	0.06 - 0.11	0.07 - 0.13	0.08 - 0.15	0.08 - 0.15	0.3 x *øDc*	0.2 x *øDc*

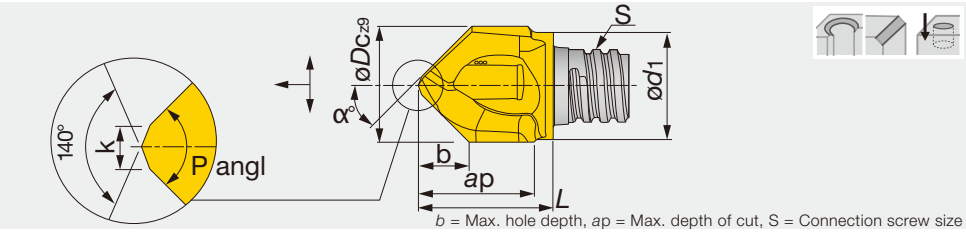
Standard cutting conditions: Profiling for semi-finishing and finishing (VBB-BM / BG / SG, VBD-BG, VBE-BGA)

ISO	Workpiece material	Hard-ness	Cutting speed *Vc* (m/min)	Feed per tooth: *fz* (mm/t) Tool diameter: *øDc* (mm) 6	8	10	12	16	20	25	Depth of cut *ap* (mm)	Pick feed *Pf* (mm)
P	Low carbon steels C45, C55, etc.	- 300 HB	120 - 250	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.1 x *øDc*	0.15 x *øDc*
P	High carbon steels 42CrMo4, 15Cr3, etc.	- 300 HB	100 - 220	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.1 x *øDc*	0.15 x *øDc*
P	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	100 - 200	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.1 x *øDc*	0.15 x *øDc*
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200 HB	80 - 120	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.1 x *øDc*	0.15 x *øDc*
K	Grey cast irons 250, 300, etc.	150 - 250 HB	120 - 280	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.1 x *øDc*	0.15 x *øDc*
K	Ductile cast irons 400-15S, etc.	150 - 250 HB	120 - 280	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.1 x *øDc*	0.15 x *øDc*
N	Aluminium alloys Si < 13%	-	300 - 1000	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.1 x *øDc*	0.15 x *øDc*
N	Aluminium alloys Si ≥13%	-	150 - 400	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.1 x *øDc*	0.15 x *øDc*
S	Titanium alloys Ti-6Al-4V, etc.	-	50 - 100	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.08 x *øDc*	0.1 x *øDc*
S	Heat-resistant alloys Inconel 718, etc.	50 - 60 HRC	30 - 50	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.08 x *øDc*	0.1 x *øDc*
H	Hardened steel X40CrMoV5 1, 55NiCrMoV6, etc.	-	50 - 100	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.08 x *øDc*	0.1 x *øDc*
H	Hardened steel X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	30 - 80	0.04 - 0.09	0.06 - 0.11	0.07 - 0.12	0.08 - 0.13	0.09 - 0.16	0.1 - 0.18	0.1 - 0.18	0.08 x *øDc*	0.1 x *øDc*

TUNGMEISTER

VCP**-02...

TungMeister head with 2 pressed flutes for spot drilling and chamfering



b = Max. hole depth, *ap* = Max. depth of cut, S = Connection screw size

Designation	AH725	P angl	z	Helx	øDc	ød1	Max. ap	b	S	L	k	α°	Wrench	Torque*
VCP100L09.5A30-02S06	●	60°	2	0°	10	9.5	8.5	7.5	S06	11.75	1.5	30	KEYV-S06	10
VCP120L12.0A30-02S08	●	60°	2	0°	12	11.5	11	9.2	S08	15.4	1.5	30	KEYV-S08	15
VCP160L15.0A30-02S10	●	60°	2	0°	16	15.2	16	12	S10	20.2	2.5	30	KEYV-S10	28
VCP080L07.7A45-02S05	●	90°	2	0°	8	7.6	7.5	3.7	S05	9.75	1	45	KEYV-S05	7
VCP083L07.9A45-02S05	●	90°	2	0°	8.3	7.6	7.5	3.8	S05	10	1	45	KEYV-S05	7
VCP100L09.0A45-02S06	●	90°	2	0°	10	9.5	9.5	4.4	S06	11.75	1.5	45	KEYV-S06	10
VCP104L09.0A45-02S06	●	90°	2	0°	10.4	9.5	9.5	4.6	S06	11.75	1.5	45	KEYV-S06	10
VCP120L12.0A45-02S08	●	90°	2	0°	12	11.5	11.5	5.4	S08	15.4	1.5	45	KEYV-S08	15
VCP124L12.0A45-02S08	●	90°	2	0°	12.4	11.5	11.5	5.6	S08	15.4	1.5	45	KEYV-S08	15
VCP160L15.0A45-02S10	●	90°	2	0°	16	15.2	15	7.1	S10	18.8	1.5	45	KEYV-S10	28
VCP165L15.0A45-02S10	●	90°	2	0°	16.5	15.2	15	7.1	S10	18.8	1.5	45	KEYV-S10	28
VCP100L09.5A60-02S06	●	120°	2	0°	10	9.5	9.5	2.7	S06	12.7	1.5	60	KEYV-S06	10
VCP120L12.0A60-02S08	●	120°	2	0°	12	11.5	11.5	3.3	S08	15.2	1.5	60	KEYV-S08	15
VCP160L15.5A60-02S10	●	120°	2	0°	16	15.2	16	4.4	S10	19.9	1.5	60	KEYV-S10	28

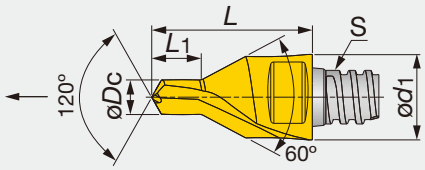
● : Line up

• Min. chamfering: ø1.5 mm
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

TUNGMEISTER

VDP**-02...

TungMeister head for center drilling



S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	L1	S	L	Wrench	Torque*
VDP328L04.6A30-02S05	●	2	0°	3.28	8	4.6	S05	15	KEYV-S05	7
VDP412L05.9A30-02S06	●	2	0°	4.12	10	5.9	S06	19	KEYV-S06	10
VDP513L07.2A30-02S08	●	2	0°	5.13	12	7.2	S08	23	KEYV-S08	15
VDP646L08.9A30-02S10	●	2	0°	6.46	16	8.9	S10	28	KEYV-S10	28

● : Line up

*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

Reference pages

Standard cutting conditions → **D238**

STANDARD CUTTING CONDITIONS

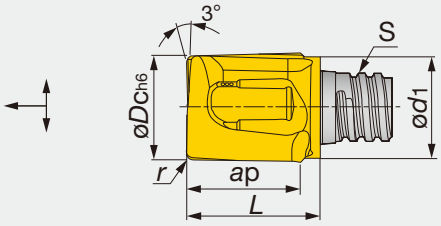
Drilling (VCP, VDP)

ISO	Workpiece material		Hardness	Cutting speed *Vc* (m/min)	Feed: *f* (mm/rev)				
					VDP328	VDP412	VDP513	VDP646	VCP
P	Low carbon steels C45, C55, etc.		- 300 HB	40 - 80	0.04 - 0.08	0.05 - 0.10	0.05 - 0.10	0.06 - 0.12	0.06 - 0.12
	High carbon steels 42CrMo4, 15Cr3, etc.		- 300 HB	30 - 50	0.04 - 0.08	0.05 - 0.10	0.05 - 0.10	0.06 - 0.12	0.06 - 0.12
	Prehardened steel PX5, NAK80, etc.		30 - 40 HRC	20 - 30	0.04 - 0.08	0.05 - 0.10	0.05 - 0.10	0.06 - 0.12	0.06 - 0.12
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200 HB	15 - 25	0.04 - 0.08	0.05 - 0.10	0.05 - 0.10	0.06 - 0.12	0.06 - 0.12
K	Grey cast irons 250, 300, etc.		150 - 250 HB	60 - 100	0.05 - 0.09	0.07 - 0.12	0.07 - 0.12	0.12 - 0.18	0.12 - 0.18
	Ductile cast irons 400-15S, etc.		150 - 250 HB	60 - 100	0.04 - 0.08	0.05 - 0.10	0.05 - 0.10	0.10 - 0.15	0.10 - 0.15
S	Titanium alloys Ti-6Al-4V, etc.		-	15 - 25	0.04 - 0.07	0.04 - 0.07	0.04 - 0.07	0.04 - 0.07	0.04 - 0.07
	Heat-resistant alloys Inconel 718, etc.		-	10 - 20	0.03 - 0.06	0.03 - 0.06	0.03 - 0.06	0.03 - 0.06	0.03 - 0.06
H	Hardened steel	X40CrMoV5 1, 55NiCrMoV6, etc.	40 - 50 HRC	15 - 25	0.04 - 0.07	0.04 - 0.07	0.04 - 0.07	0.04 - 0.07	0.04 - 0.07
		X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	10 - 20	0.03 - 0.06	0.03 - 0.06	0.03 - 0.06	0.03 - 0.06	0.03 - 0.06

TUNGMEISTER

VGC**-02...

TungMeister head for counter boring



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	r	S	L	Wrench	Torque*
VGC078L08.0R02-02S05	●	2	10°	7.8	7.60	8.0	0.20	S05	10.0	KEYV-S05	7.0
VGC080L08.0R04-02S05	●	2	10°	8	7.60	8.0	0.40	S05	10.0	KEYV-S05	7.0
VGC080L08.0R10-02S05	●	2	10°	8	7.60	8.0	1.00	S05	10.0	KEYV-S05	7.0
VGC080L08.0R20-02S05	●	2	10°	8	7.60	8.0	2.00	S05	10.0	KEYV-S05	7.0
VGC098L09.0R03-02S06	●	2	10°	9.8	9.50	9.5	0.30	S06	12.4	KEYV-S06	10.0
VGC100L09.0R04-02S06	●	2	10°	10	9.50	9.5	0.40	S06	12.4	KEYV-S06	10.0
VGC100L09.0R10-02S06	●	2	10°	10	9.50	9.5	1.00	S06	12.4	KEYV-S06	10.0
VGC100L09.0R20-02S06	●	2	10°	10	9.50	9.5	2.00	S06	12.4	KEYV-S06	10.0
VGC117L10.0R03-02S08	●	2	10°	11.7	11.50	10.0	0.30	S08	14.2	KEYV-S08	15.0
VGC120L10.0R04-02S08	●	2	10°	12	11.50	10.0	0.40	S08	14.2	KEYV-S08	15.0
VGC120L10.0R10-02S08	●	2	10°	12	11.50	10.0	1.00	S08	14.2	KEYV-S08	15.0
VGC120L10.0R20-02S08	●	2	10°	12	11.50	10.0	2.00	S08	14.2	KEYV-S08	15.0
VGC157L15.0R03-02S10	●	2	10°	15.7	15.20	15.0	0.30	S10	19.0	KEYV-S10	28.0
VGC160L15.0R04-02S10	●	2	10°	16	15.20	15.0	0.40	S10	19.0	KEYV-S10	28.0
VGC160L15.0R08-02S10	●	2	10°	16	15.20	15.0	0.80	S10	19.0	KEYV-S10	28.0

• Can drill with step feed
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

STANDARD CUTTING CONDITIONS

Counter boring (VGC)

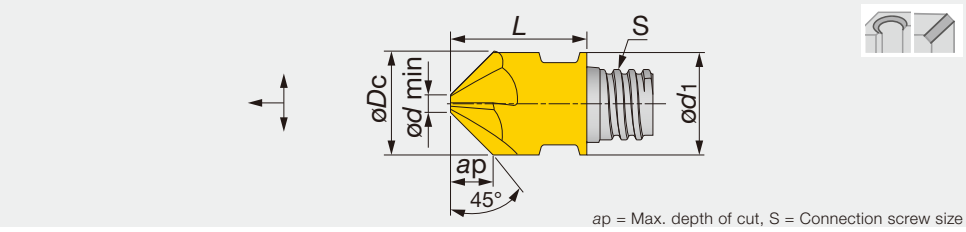
ISO	Workpiece material		Hardness	Cutting speed Vc (m/min)	Feed f (mm/rev)
P	Low carbon steels C45, C55, etc.		- 300 HB	40 - 80	0.04 - 0.08
	High carbon steels 42CrMo4, 15Cr3, etc.		- 300 HB	30 - 50	0.04 - 0.08
	Prehardened steel PX5, NAK80, etc.		30 - 40 HRC	20 - 30	0.04 - 0.08
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200 HB	15 - 25	0.04 - 0.08
K	Grey cast irons 250, 300, etc.		150 - 250 HB	60 - 100	0.05 - 0.09
	Ductile cast irons 400-15S, etc.		150 - 250 HB	60 - 100	0.04 - 0.08
S	Titanium alloys Ti-6Al-4V, etc.		-	15 - 25	0.04 - 0.07
	Heat-resistant alloys Inconel 718, etc.		-	10 - 20	0.03 - 0.06
H	Hardened steel	X40CrMoV5 1, 55NiCrMoV6, etc.	40 - 50 HRC	15 - 25	0.04 - 0.07
		X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	10 - 20	0.03 - 0.06

・When drilling, the step feed (woodpeckering feed) operation should be applied with the depth of 0.3 - 0.5 mm per step.
・Apply the same cutting conditions as the VEE type head when conducting shoulder milling or slotting operations.

TUNGMEISTER

VCA**-04,06...

TungMeister head with 4 or 6 flutes for countersinking and chamfering



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	Max. ap	ød min	S	L	Wrench	Torque**
VCA100L04.0A45-04S06	●	4	0°	10	10	4	1.95	S06	13	KEYV-S06	10
VCA120L05.0A45-04S08	●	4	0°	12	12	5	1.95	S08	16.5	KEYV-S08	15
VCA127L05.3A45-04S08	●	4	0°	12.7	12.7	5.3	1.98	S08	16.5	KEYV-S08	15
VCA160L06.5A45-06S10	●	6	0°	16	16	6.5	3	S10	20.3	KEYV-S10	28
VCA200L07.5A45-06S12	●	6	0°	20	18.3	7.5	5	S12	25.5	KEYV-S12	28

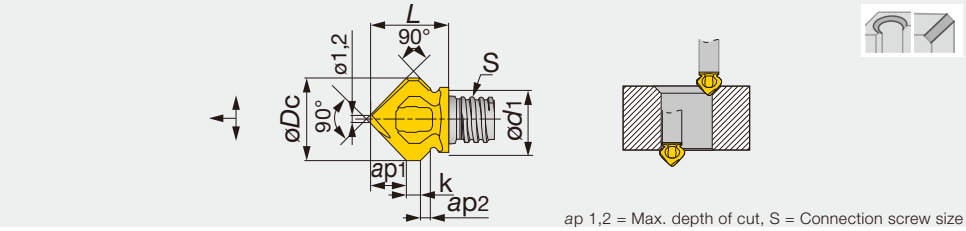
**Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VCW**-02...

TungMeister head for countersinking, top and bottom chamfering



ap 1,2 = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	ap1	ap2	k	S	L	Wrench	Torque**
VCW118L05.0A45-02S06	●	2	0°	11.8	9.3	5	1.2	2	S06	11.2	KEYV-S06	10

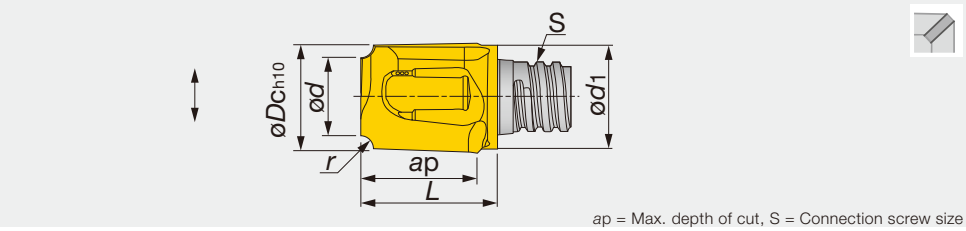
• Available for chamfering of reverse side
* Some heads require different wrench sizes.
**Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VCR**-02...

TungMeister head with 2 pressed flutes for concave radius chamfering



ap = Max. depth of cut, S = Connection screw size

Designation	AH725	z	Helx	øDc	ød1	ød	Max. ap	r	S	L	Wrench	Torque**
VCR080L07.5R10-02S05	●	2	0°	8	7.6	5.8	7.5	1	S05	10.5	KEYV-S05	7
VCR100L09.5R16-02S06	●	2	0°	10	9.5	6.8	9.5	1.6	S06	12.5	KEYV-S06	10
VCR100L09.5R25-02S06	●	2	0°	10	9.5	5.1	9.5	2.5	S06	12.5	KEYV-S06	10
VCR127L12.0R30-02S08	●	2	0°	12.7	12.2	6.5	12.0	3	S08	15.6	KEYV-S08	15
VCR127L12.0R40-02S08	●	2	0°	12.7	12.2	4.7	12.0	4	S08	15.6	KEYV-S08	15
VCR160L15.0R50-02S10	●	2	0°	16	15.2	6.2	15.0	5	S10	19.1	KEYV-S10	28
VCR200L07.0R60-02S12	●	2	0°	20	18.3	8	7.0	6	S12	17.4	KEYV-S12	28

**Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

Reference pages

Standard cutting conditions → **D241**

STANDARD CUTTING CONDITIONS

Chamfering and countersinking (VCA, VCW, VCR, VCP)

ISO	Workpiece material		Hardness	Cutting speed *Vc* (m/min)	Feed *f* (mm/rev)
P	Low carbon steels C45, C55, etc.		- 300 HB	60 - 100	0.06 - 0.12
	High carbon steels 42CrMo4, 15Cr3, etc.		- 300 HB	50 - 80	0.06 - 0.12
	Prehardened steel PX5, NAK80, etc.		30 - 40 HRC	40 - 70	0.06 - 0.12
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.		- 200 HB	30 - 50	0.06 - 0.12
K	Grey cast irons 250, 300, etc.		150 - 250 HB	80 - 120	0.06 - 0.12
	Ductile cast irons 400-15S, etc.		150 - 250 HB	80 - 120	0.06 - 0.12
N	Aluminium alloys		-	100 - 200	0.08 - 0.15
S	Titanium alloys Ti-6Al-4V, etc.		-	30 - 50	0.05 - 0.1
	Heat-resistant alloys Inconel 718, etc.		-	20 - 40	0.04 - 0.08
H	Hardened steel	X40CrMoV5 1, 55NiCrMoV6, etc.	40 - 50 HRC	30 - 50	0.05 - 0.1
		X153CrMoV12, HS18-0-1, etc.	50 - 60 HRC	20 - 40	0.04 - 0.08

TOLERANCE OF TOOL DIAMETER

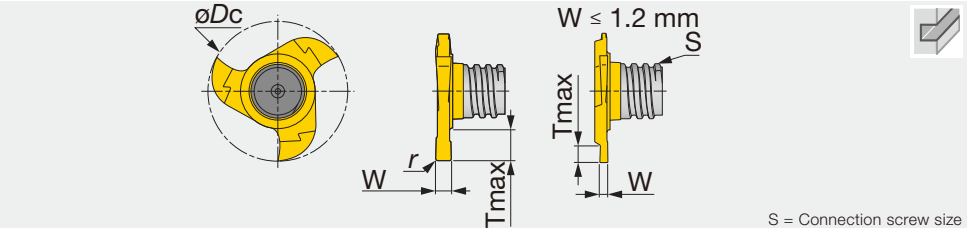
Basic dimensions (mm)		Permissible dimensional deviations (μm)						
>	≤	e8	e9	h6	h7	h9	h10	z9
6	10	-25 -47	-25 -61	0 -9	0 -15	0 -36	0 -58	+78 +42
10	14	-32 -59	-32 -75	0 -11	0 -18	0 -43	0 -70	+93 +50
14	18	-32 -59	-32 -75	0 -11	0 -18	0 -43	0 -70	+103 +60
18	30	-40 -73	-40 -92	0 -13	0 -21	0 -52	0 -84	-

● JISB0401-2: 1998 (ISO286-2: 1988) extract

TUNGMEISTER

VST**-3...

TungMeister head for slotting of 1.5 - 3.17mm width with 3 teeth



Designation	GH130	z	Helx	øDc	W± 0.02	r	S	T max	Wrench	Torque*
VST157W1.50R010-3S06	●	3	0°	15.7	1.5	0.1	S06	2.8	KEYV-177	10
VST157W1.57R020-3S06	●	3	0°	15.7	1.57	0.2	S06	2.8	KEYV-177	10
VST157W2.00R020-3S06	●	3	0°	15.7	2	0.2	S06	2.8	KEYV-177	10
VST157W2.39R020-3S06	●	3	0°	15.7	2.39	0.2	S06	2.8	KEYV-177	10
VST157W2.50R020-3S06	●	3	0°	15.7	2.5	0.2	S06	2.8	KEYV-177	10
VST157W3.00R020-3S06	●	3	0°	15.7	3	0.2	S06	2.8	KEYV-177	10
VST157W3.17R020-3S06	●	3	0°	15.7	3.17	0.2	S06	2.8	KEYV-177	10
VST177W1.20R005-3S06	●	3	0°	17.7	1.2(1)	0.05	S06	3.8	KEYV-177	10
VST177W1.40R005-3S06	●	3	0°	17.7	1.4(1)	0.05	S06	3.8	KEYV-177	10
VST177W1.50R010-3S06	●	3	0°	17.7	1.5	0.1	S06	3.8	KEYV-177	10
VST177W1.57R020-3S06	●	3	0°	17.7	1.57	0.2	S06	3.8	KEYV-177	10
VST177W1.70R005-3S06	●	3	0°	17.7	1.7(1)	0.05	S06	3.8	KEYV-177	10
VST177W2.00R020-3S06	●	3	0°	17.7	2	0.2	S06	3.8	KEYV-177	10
VST177W2.20R110-3S06	●	3	0°	17.7	2.2	1.1	S06	3.8	KEYV-177	10
VST177W2.39R020-3S06	●	3	0°	17.7	2.39	0.2	S06	3.8	KEYV-177	10
VST177W2.50R020-3S06	●	3	0°	17.7	2.5	0.2	S06	3.8	KEYV-177	10
VST177W3.00R020-3S06	●	3	0°	17.7	3	0.2	S06	3.8	KEYV-177	10
VST177W3.17R020-3S06	●	3	0°	17.7	3.17	0.2	S06	3.8	KEYV-177	10

(1) W is based on DIN471 / 472
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

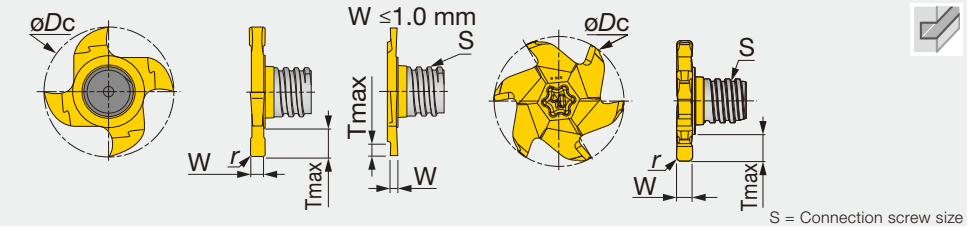
Reference pages

Standard cutting conditions → **D245**

TUNGMEISTER

VST**-4,6...

TungMeister head for slotting of 0.76 - 10mm width with 4, 6 teeth



Designation	GH130	Helx	z	øDc	W±0.02	r	S	T max	Wrench	Torque*
VST217W0.76R000-4S08	●	0°	4	21.7	0.76(1)	-	S08	1.5	KEYV-217	15
VST217W0.86R000-4S08	●	0°	4	21.7	0.86(1)	-	S08	1.7	KEYV-217	15
VST217W0.96R000-4S08	●	0°	4	21.7	0.96(1)	-	S08	1.9	KEYV-217	15
VST217W1.00R005-4S08	●	0°	4	21.7	1	0.05	S08	2	KEYV-217	15
VST217W1.20R005-4S08	●	0°	4	21.7	1.2(1)	0.05	S08	4.5	KEYV-217	15
VST217W1.40R005-4S08	●	0°	4	21.7	1.4(1)	0.05	S08	4.5	KEYV-217	15
VST217W1.57R000-4S08	●	0°	4	21.7	1.57	-	S08	4.5	KEYV-217	15
VST217W1.70R010-4S08	●	0°	4	21.7	1.7(1)	0.1	S08	4.5	KEYV-217	15
VST217W1.95R020-4S08	●	0°	4	21.7	1.95(1)	0.2	S08	4.5	KEYV-217	15
VST217W2.00R020-4S08	●	0°	4	21.7	2	0.2	S08	4.5	KEYV-217	15
VST217W2.25R020-4S08	●	0°	4	21.7	2.25(1)	0.2	S08	4.5	KEYV-217	15
VST217W2.39R020-4S08	●	0°	4	21.7	2.39	0.2	S08	4.5	KEYV-217	15
VST217W2.50R020-4S08	●	0°	4	21.7	2.5	0.2	S08	4.5	KEYV-217	15
VST217W2.75R020-4S08	●	0°	4	21.7	2.75(1)	0.2	S08	4.5	KEYV-217	15
VST217W3.00R020-4S08	●	0°	4	21.7	3	0.2	S08	4.5	KEYV-217	15
VST217W3.17R020-4S08	●	0°	4	21.7	3.17	0.2	S08	4.5	KEYV-217	15
VST217W3.25R020-4S08	●	0°	4	21.7	3.25(1)	0.2	S08	4.5	KEYV-217	15
VST217W4.00R020-4S08	●	0°	4	21.7	4	0.2	S08	4.5	KEYV-217	15
VST217W4.25R020-4S08	●	0°	4	21.7	4.25(1)	0.2	S08	4.5	KEYV-217	15
VST217W4.75R020-4S08	●	0°	4	21.7	4.75	0.2	S08	4.5	KEYV-217	15
VST217W5.25R020-4S08	●	0°	4	21.7	5.25(1)	0.2	S08	4.5	KEYV-217	15
VST277W2.50R020-6S10	●	0°	6	27.7	2.5	0.2	S10	6	KEYV-T40L	28
VST277W5.25R020-6S10	●	0°	6	27.7	5.25	0.2	S10	6	KEYV-T40L	28
VST277W10.0R020-6S10	●	0°	6	27.7	10	0.2	S10	6	KEYV-T40L	28

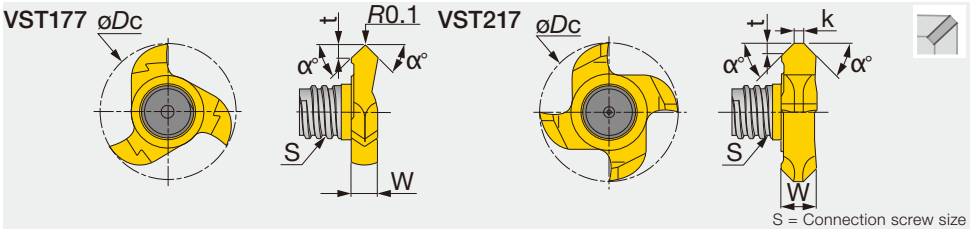
(1) W is based on DIN471 / 472
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VST**A45...

TungMeister head for chamfering on slots



Designation	GH130	z	Helx	øDc	W	α°	S	t	k	Wrench	Torque*
VST177L01.40A45-3S06	●	3	0°	17.7	3.4	45	S06	1.4	-	KEYV-177	10
VST217L01.70A45-4S08	●	4	0°	21.7	5.5	45	S08	1.7	1.5	KEYV-217	15

*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

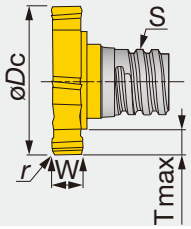
Reference pages

Standard cutting conditions → **D245**

TUNGMEISTER

VTB**-06...

TungMeister head for T-slotting of 3 - 8mm width



S = Connection screw size

Designation	GH130	z	Helx	øDc -0.05 0	W ±0.02	T max	S	r	Wrench	Torque*
VTB135W3.00R04-06S05	●	6	0°	13.5	3	2.65	S05	0.4	KEYV-T20	7
VTB135W4.00R04-06S05	●	6	0°	13.5	4	2.65	S05	0.4	KEYV-T20	7
VTB160W2.00R04-06S06	●	6	0°	16	2	2.9	S06	0.4	KEYV-T20	10
VTB160W3.00R04-06S06	●	6	0°	16	3	2.9	S06	0.4	KEYV-T25	10
VTB160W4.00R04-06S06	●	6	0°	16	4	2.9	S06	0.4	KEYV-T25	10
VTB165W2.00R04-06S06	●	6	0°	16.5	2	3.15	S06	0.4	KEYV-T20	10
VTB165W3.00R04-06S06	●	6	0°	16.5	3	3.15	S06	0.4	KEYV-T25	10
VTB165W4.00R04-06S06	●	6	0°	16.5	4	3.15	S06	0.4	KEYV-T25	10
VTB195W4.00R04-06S08	●	6	0°	19.5	4	3.45	S08	0.4	KEYV-T30L	15
VTB195W5.00R04-06S08	●	6	0°	19.5	5	3.45	S08	0.4	KEYV-T30L	15
VTB195W6.00R04-06S08	●	6	0°	19.5	6	3.45	S08	0.4	KEYV-T30L	15
VTB225W5.00R04-06S08	●	6	0°	22.5	5	4.95	S08	0.4	KEYV-T40L	15
VTB225W6.00R04-06S08	●	6	0°	22.5	6	4.95	S08	0.4	KEYV-T40L	15
VTB225W8.00R04-06S08	●	6	0°	22.5	8	4.95	S08	0.4	KEYV-T40L	15
VTB250W6.00R04-06S08	●	6	0°	25	6	5.9	S08	0.4	KEYV-T50L	15
VTB250W8.00R04-06S08	●	6	0°	25	8	5.9	S08	0.4	KEYV-T50L	15
VTB250W5.00R04-06S10	●	6	0°	25	5	4.3	S10	0.4	KEYV-T50L	28
VTB250W6.00R04-06S10	●	6	0°	25	6	4.3	S10	0.4	KEYV-T50L	28
VTB250W8.00R04-06S10	●	6	0°	25	8	4.3	S10	0.4	KEYV-T50L	28

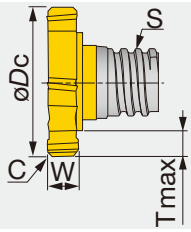
*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

TUNGMEISTER

VTB**C15-06...

TungMeister head for T-slotting of 2 mm width with chamfered edges



S = Connection screw size

Designation	GH130	z	Helx	øDc -0.05 0	W ±0.05	T max	S	C	Wrench	Torque*
VTB135W2.00C15-06S05	●	6	0°	13.5	2	2.65	S05	0.15	KEYV-T20	7

*Torque: Recommended torque (N·m) for clamping.
Packing quantity = 2 pcs.

●: Line up

Reference pages

Standard cutting conditions → **D245**

STANDARD CUTTING CONDITIONS

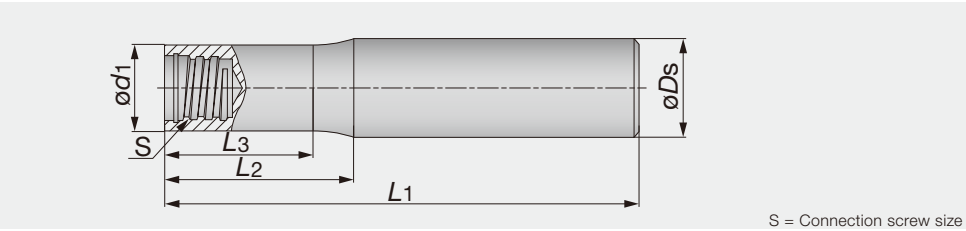
Slotting (VST, VTB)

ISO	Workpiece material	Hardness HB	VST type		VTB type	
			Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)	Cutting speed *Vc* (m/min)	Feed per tooth *fz* (mm/t)
P	Low carbon steels C45, C55, etc.	- 300	80 - 180	0.05 - 0.15	80 - 180	0.08 - 0.18
	High carbon steels 42CrMo4, 15Cr3, etc.	- 300	60 - 120	0.04 - 0.12	60 - 120	0.05 - 0.15
M	Stainless steels X5CrNi18-9, X5CrNiMo17-12-2, etc.	- 200	50 - 120	0.04 - 0.12	50 - 120	0.05 - 0.15
K	Grey cast irons 250, 300, etc.	150 - 250	100 - 200	0.05 - 0.15	100 - 200	0.08 - 0.18
	Ductile cast irons 400-15S, etc.	150 - 250	100 - 200	0.04 - 0.12	100 - 200	0.05 - 0.15
N	Aluminium alloys Si < 13%	-	200 - 600	0.05 - 0.15	200 - 600	0.08 - 0.18
	Aluminium alloys Si ≥13%	-	100 - 300	0.03 - 0.13	100 - 300	0.05 - 0.15
S	Titanium alloys Ti-6Al-4V, etc.	-	40 - 60	0.04 - 0.12	40 - 60	0.05 - 0.15
	Heat-resistant alloys Inconel 718, etc.	-	15 - 35	0.02 - 0.1	15 - 35	0.02 - 0.1

TUNGMEISTER

VSSD...

TungMeister, straight neck and cylindrical shank

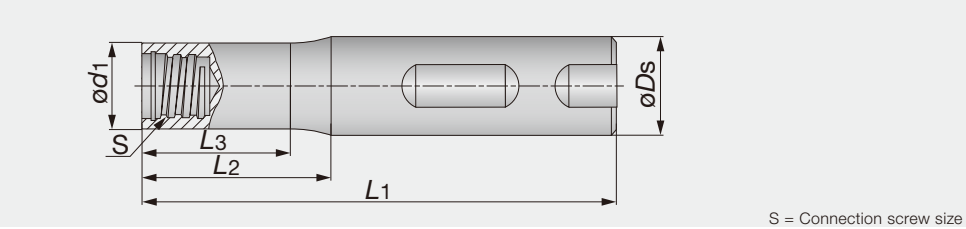


Designation	øDs	ød1	L1	L2	L3	S	Type	Material
VSSD08L060S05-S	8	7.6	60	15	12.5	S05	CYLINDRICAL	STEEL
VSSD08L070S05-C	8	7.6	70	20	18.5	S05	CYLINDRICAL	CARBIDE
VSSD08L090S05-C	8	7.6	90	40	38.5	S05	CYLINDRICAL	CARBIDE
VSSD08L110S05-C	8	7.6	110	60	58.5	S05	CYLINDRICAL	CARBIDE
VSSD10L070S06-C	10	9.6	70	20	18.5	S06	CYLINDRICAL	CARBIDE
VSSD10L075S06-S	10	9.6	75	20	17.5	S06	CYLINDRICAL	STEEL
VSSD10L090S06-C	10	9.6	90	40	38.5	S06	CYLINDRICAL	CARBIDE
VSSD10L110S06-C	10	9.6	110	60	58.5	S06	CYLINDRICAL	CARBIDE
VSSD10L150S06-C	10	9.6	150	100	98.5	S06	CYLINDRICAL	CARBIDE
VSSD12L070S08-C	12	11.5	70	20	17	S08	CYLINDRICAL	CARBIDE
VSSD12L090S08-C	12	11.5	90	40	38	S08	CYLINDRICAL	CARBIDE
VSSD12L090S08-S	12	11.5	90	16	13.5	S08	CYLINDRICAL	STEEL
VSSD12L110S08-C	12	11.5	110	60	58	S08	CYLINDRICAL	CARBIDE
VSSD12L130S08-C	12	11.5	130	80	78	S08	CYLINDRICAL	CARBIDE
VSSD16L090S10-C	16	15.2	90	40	38	S10	CYLINDRICAL	CARBIDE
VSSD16L100S10-S	16	15.2	100	20	18	S10	CYLINDRICAL	STEEL
VSSD16L110S10-C	16	15.2	110	60	58	S10	CYLINDRICAL	CARBIDE
VSSD16L130S10-C	16	15.2	130	80	78	S10	CYLINDRICAL	CARBIDE
VSSD16L150S10-C	16	15.2	150	100	98	S10	CYLINDRICAL	CARBIDE
VSSD20L090S12-C	20	18.3	90	40	37	S12	CYLINDRICAL	CARBIDE
VSSD20L120S12-S	20	18.3	120	25	20.5	S12	CYLINDRICAL	STEEL
VSSD20L130S12-C	20	18.3	130	80	77	S12	CYLINDRICAL	CARBIDE
VSSD20L200S12-C	20	18.3	200	120	117	S12	CYLINDRICAL	CARBIDE
VSSD25L120S15-C	25	23.9	120	60	58	S15	CYLINDRICAL	CARBIDE
VSSD25L135S15-S	25	23.9	135	35	33	S15	CYLINDRICAL	STEEL
VSSD25L170S15-C	25	23.9	170	100	98	S15	CYLINDRICAL	CARBIDE
VSSD25L250S15-C	25	23.9	250	150	148	S15	CYLINDRICAL	CARBIDE

TUNGMEISTER

VSSD**W...

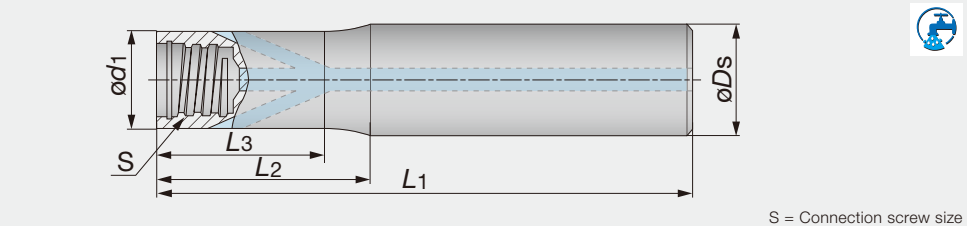
TungMeister, straight neck and weldon shank



Designation	øDs	ød1	L1	L2	L3	S	Shank	Material
VSSD12L055W05-S	12	7.6	55	3.8	-	S05	WELDON	STEEL
VSSD16L065W06-S	16	9.6	65	6	-	S06	WELDON	STEEL
VSSD16L065W08-S	16	11.5	65	4	-	S08	WELDON	STEEL
VSSD20L070W10-S	20	15.2	70	4	-	S10	WELDON	STEEL
VSSD25L075W12-S	25	18.3	75	6	-	S12	WELDON	STEEL

VSSD**-W-A

TungMeister, straight shank and neck with coolant hole

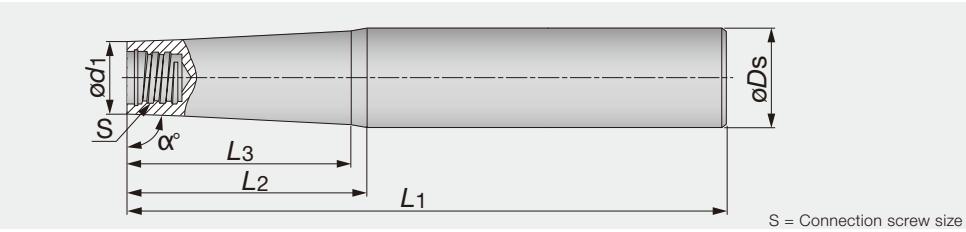


Designation	øDs	ød1	L1	L2	L3	S	Material
VSSD10L070S06-W-A	10	9.6	70	20	19	S06	TUNGSTEN
VSSD10L090S06-W-A	10	9.6	90	40	39	S06	TUNGSTEN
VSSD10L110S06-W-A	10	9.6	110	60	59	S06	TUNGSTEN
VSSD12L070S08-W-A	12	11.5	70	20	19	S08	TUNGSTEN
VSSD12L090S08-W-A	12	11.5	90	40	39	S08	TUNGSTEN
VSSD12L110S08-W-A	12	11.5	110	60	59	S08	TUNGSTEN
VSSD12L130S08-W-A	12	11.5	130	80	79	S08	TUNGSTEN
VSSD16L070S10-W-A	16	15.2	70	20	18.5	S10	TUNGSTEN
VSSD16L090S10-W-A	16	15.2	90	40	36.5	S10	TUNGSTEN
VSSD16L110S10-W-A	16	15.2	110	60	58.5	S10	TUNGSTEN
VSSD16L130S10-W-A	16	15.2	130	80	78.5	S10	TUNGSTEN
VSSD20L090S12-W-A	20	18.3	90	40	37	S12	TUNGSTEN
VSSD20L130S12-W-A	20	18.3	130	80	77	S12	TUNGSTEN

TUNGMEISTER

VTSD...

TungMeister, straight shank and taper neck

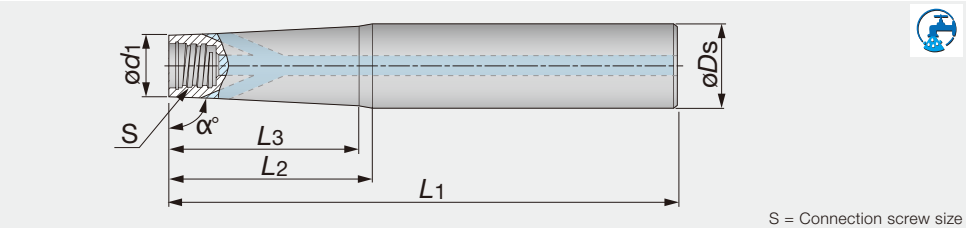


Designation	α°	øDs	ød1	L1	L2	L3	S	Material
VTSD12L080S05-S	85	12	7.6	80	25	-	S05	STEEL
VTSD12L100S05-S	89	12	7.6	100	35	29	S05	STEEL
VTSD12L110S05-C	89	12	7.6	110	60	56	S05	CARBIDE
VTSD12L130S05-C	89	12	7.6	130	80	77	S05	CARBIDE
VTSD16L125S06-S	85	16	9.6	125	34	31	S06	STEEL
VTSD16L130S08-C	89	16	11.5	130	80	76.5	S08	CARBIDE
VTSD16L140S08-S	85	16	11.5	140	22	19	S08	STEEL
VTSD16L150S05-C	89	16	7.6	150	100	91	S05	CARBIDE
VTSD16L150S06-C	89	16	9.6	150	100	94.5	S06	CARBIDE
VTSD16L150S08-C	89	16	11.5	150	100	98	S08	CARBIDE
VTSD16L160S06-S	89	16	9.6	160	55	46.5	S06	STEEL
VTSD16L170S06-C	89	16	9.6	170	120	116.5	S06	CARBIDE
VTSD20L140S10-S	85	20	15.2	140	27.5	-	S10	STEEL
VTSD20L170S08-C	89	20	11.5	170	120	112	S08	CARBIDE
VTSD20L170S08-S	89	20	11.5	170	80	69.5	S08	STEEL
VTSD20L170S10-C	89	20	15.2	170	120	119	S10	CARBIDE
VTSD20L190S10-C	89	20	15.2	190	140	-	S10	CARBIDE
VTSD20L190S10-S	89	20	15.2	190	80	73	S10	STEEL
VTSD20L210S10-C	89	20	15.2	210	160	-	S10	CARBIDE
VTSD25L160S12-S	85	25	18.3	160	40	-	S12	STEEL
VTSD25L170S10-S	85	25	15.2	170	56	-	S10	STEEL
VTSD25L180S12-C	89	25	18.3	180	120	115	S12	CARBIDE
VTSD25L210S12-S	89	25	18.3	210	100	94.5	S12	STEEL
VTSD25L250S12-C	89	25	18.3	250	140	136.5	S12	CARBIDE
VTSD32L155S15-S	85	32	23.9	155	45	-	S15	STEEL
VTSD32L190S12-S	85	32	18.3	190	80	-	S12	STEEL
VTSD32L220S15-S	88	32	23.9	220	100	-	S15	STEEL
VTSD32L250S15-C	89	32	23.9	250	150	145	S15	CARBIDE
VTSD32L300S15-C	89	32	23.9	300	200	198	S15	CARBIDE

TUNGMEISTER

VTSD**-W-A

TungMeister, straight shank and taper neck with coolant hole

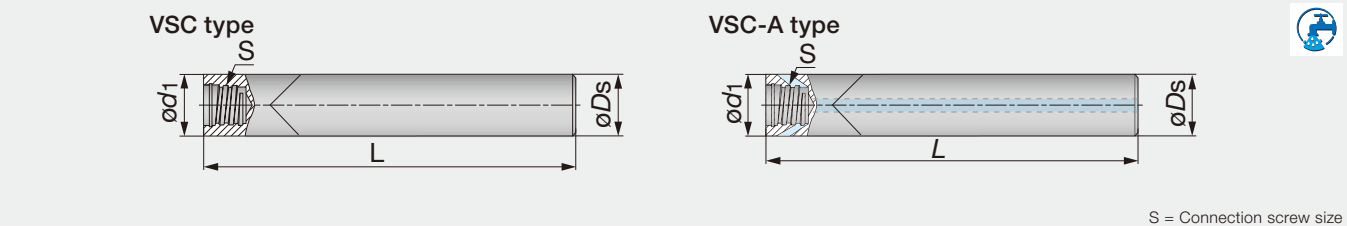


Designation	α°	øDs	ød1	L1	L2	L3	S	Material
VTSD12L110S06-W-A	89	12	9.6	110	60	59	S06	TUNGSTEN
VTSD16L170S06-W-A	89	16	9.6	170	120	116	S06	TUNGSTEN

TUNGMEISTER

VSC...

TungMeister, straight shank for VST type slotting heads



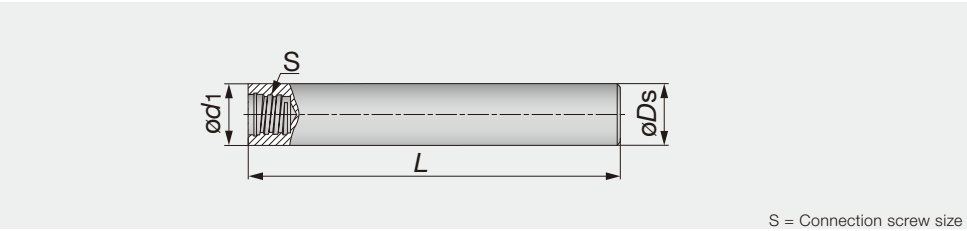
Designation	øDs	ød1	L	S	Air hole	Material
VSC100L100S06-C	10	10	100	S06	without	CARBIDE
VSC120L100S08-C-A	12	12	100	S08	with	CARBIDE

- For VSC-C type shank, just VST slotting head is recommended.
- If other heads are used on the VSC-C shank, the depth of cut must be smaller than the max. ap in each head.
- The VSC-C type shank does not have external clearance, so the shank may interfere with the work piece.

TUNGMEISTER

VSTD...

TungMeister, straight shank for VTB type slotting heads



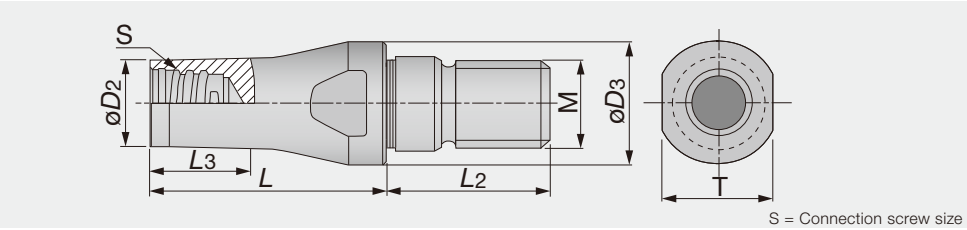
Designation	øDs	ød1	L	S	Material
VSTD08L070S05-S	8	8	70	S05	STEEL
VSTD10L080S06-S	10	10	80	S06	STEEL
VSTD12L090S08-S	12	12	90	S08	STEEL
VSTD16L100S10-S	16	16	100	S10	STEEL

- For VSTD type shank, just VTB grooving head is recommended.
- If other heads are used on the VSTD shank, the depth of cut must be smaller than the max. ap in each head.
- The VSTD type shank does not have external clearance, so the shank may interfere with the work piece.

TUNGMEISTER TUNGFLEX

VAD**-M...

TungFlex conversion adaptor with TungMeister



Designation	øD2	øD3	L	L2	L3	S	M	T
VAD130L016S08-S-M8	11.7	13	16	17.5	6	S08	M8	11
VAD130L025S08-S-M8	11.7	13	25	17.5	20	S08	M8	11
VAD180L020S08-S-M10	11.7	18	20	20	12	S08	M10	13
VAD180L025S08-S-M10	11.7	18	25	20	15	S08	M10	11
VAD210L020S08-S-M12	11.7	21	20	20	10	S08	M12	12.75
VAD210L025S08-S-M12	11.7	21	25	20	13	S08	M12	12.75

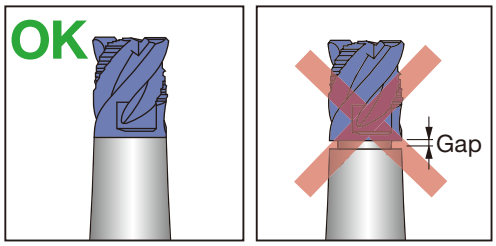
WRENCH

Appearance	Designation	Connection screw size	Torque (N·m)	Applicable head
	KEYV-S05	S05	7	Square Ball Radius Drilling Chamfering Counter boring
	KEYV-S06	S06	10	
	KEYV-S08	S08	15	
	KEYV-S10	S10	28	
	KEYV-S12	S12	28	
	KEYV-W20	S15	40	
	KEYV-177	S06	10	Slotting VST type
	KEYV-217	S08	15	
	KEYV-T40L	S08	15	Slotting VST, VTB type
		S10	28	
	KEYV-T20	S05	7	Slotting VTB type
		S06	10	
	KEYV-T25	S06	10	
	KEYV-T30L	S08	15	
	KEYV-T50L	S08	15	
		S10	28	

Note: Optional parts

CAUTIONARY POINTS IN USE

- The cutting heads specified by Tungaloy must be used. Avoid using alternate heads that are not Tungaloy products as this will damage the shank and can cause severe accident or injury.
- Before setting the head, clean the connection screw with an air blast or a wiping cloth to remove chips and other foreign matter that may remain.
- Do not apply the lubricant to the connection screw.
- Please use the correct “Wrench” with the correct cutting head. Tighten the head slowly until the face of the head contacts the shank. (Please refer to the picture shown on the right.) Do not re-tightening or over-tightening. Excessive tightening may cause the cutting head to break.
- Do not apply excessive force or a hammer when tightening or exchanging the cutting heads.



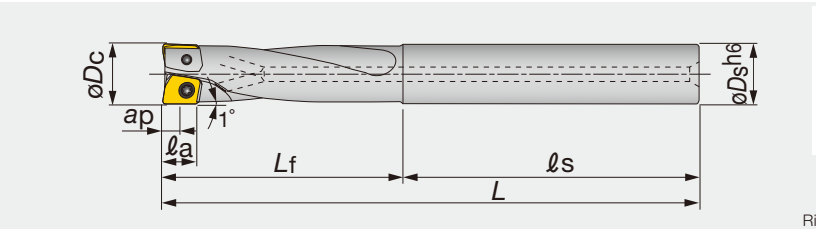
MEMO

HYBRIDTACMILL

EVH

Multi purpose endmills with center edge in small diameter

A.R. = +20, R.R. = +12

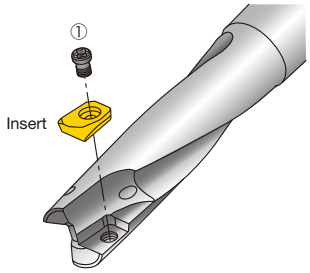


Right hand (R) shown.

Designation	Max. ap	øDc	z	øDs	ℓs	Lf	ℓa	L	Insert
EVH06R010M10.0-02	3	10	2	10	50	40	5	90	XVGT06H20...
EVH07R012M12.0-02	3.5	12	2	12	50	48	6	98	XVGT07X30...
EVH09R016M16.0-02	4.5	16	2	16	60	64	8	124	XVGT09X40...

SPARE PARTS

Designation	① Clamping screw	Lubricant	Wrench	Wrench 1
EVH06R010M10.0-02	CSPD-1.8S	M-1000	-	IP-6F
EVH07R012M12.0-02	CSPB-2H	M-1000	-	IP-6F
EVH09R016M16.0-02	CSPB-2.5S	M-1000	IP-8D	-

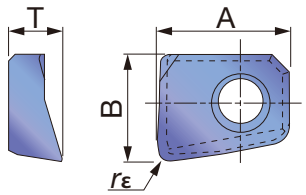


Reference pages

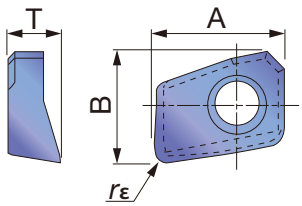
Inserts → **D253**, Standard cutting conditions → **D254**

INSERT

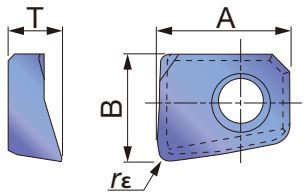
XVGT EC-MJ (Central)



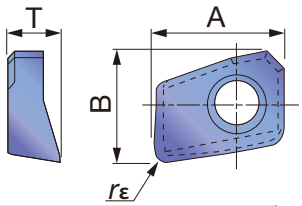
XVGT EP-MJ (Peripheral)



XVGT FC-AJ (Central)



XVGT FP-AJ (Peripheral)



P	Steel	★	
M	Stainless	★	
K	Cast iron	★	
N	Non-ferrous		★
S	Superalloys		
H	Hard materials		

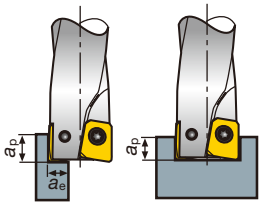
★ : First choice
☆ : Second choice

Designation	rε	Max. ap	Coated AH730	Coated DS1200	A	B	T
XVGT06H205EC-MJ	0.5	3	●		6.2	5	2.5
XVGT07X305EC-MJ	0.5	3.5	●		7.1	6.1	3
XVGT09X405EC-MJ	0.5	4.5	●		9	8.2	4
XVGT06H205EP-MJ	0.5	3	●		6.2	5.3	2.5
XVGT07X305EP-MJ	0.5	3.5	●		7.1	6.4	3
XVGT09X405EP-MJ	0.5	4.5	●		9	8.2	4
XVGT06H205FC-AJ	0.5	3		●	6.2	5	2.5
XVGT07X305FC-AJ	0.5	3.5		●	7.1	6.1	3
XVGT09X405FC-AJ	0.5	4.5		●	9	8.2	4
XVGT06H205FP-AJ	0.5	3		●	6.2	5.3	2.5
XVGT07X305FP-AJ	0.5	3.5		●	7.1	6.4	3
XVGT09X405FP-AJ	0.5	4.5		●	9	8.2	4

●: Line up

STANDARD CUTTING CONDITIONS

●Shoulder milling, Slotting

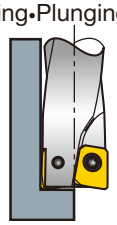


Side cutting Slotting

a_p: Axial depth of cut
a_e: Radial depth of cut

Workpiece material		Carbon steels and alloy steels		Alloy steels and prehardened steelst		Stainless steels		Cast irons		Aluminium alloys (Si < 13%)		Aluminium alloys (Si ≥ 13%)	
Hardness		< 30HRC		30 ~ 40HRC		< 250HB		–		–		–	
Cutting speed		V_c = 50 ~ 120 m/min		V_c = 30 ~ 100 m/min		V_c = 50 ~ 120 m/min		V_c = 60 ~ 140 m/min		V_c = 100 ~ 300 m/min		V_c = 100 ~ 200 m/min	
Conditions		No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min
Tool dia. (mm)	ø10	2550	380	1910	190	2550	380	3180	510	6370	1020	4770	670
	ø12	2120	320	1590	160	2120	320	2650	420	5300	850	3980	560
	ø16	1590	240	1190	120	1590	240	1990	320	3980	640	2980	420
Depth of cut	Side cutting	a_p < 0.25D a_e < 0.2D		a_p < 0.25D a_e < 0.2D		a_p < 0.25D a_e < 0.2D		a_p < 0.25D a_e < 0.3D		a_p < 0.25D a_e < 0.3D		a_p < 0.25D a_e < 0.3D	
	Slotting	a_p < 0.1D		a_p < 0.1D		a_p < 0.1D		a_p < 0.15D		a_p < 0.2D		a_p < 0.2D	

●Drilling•Plunging

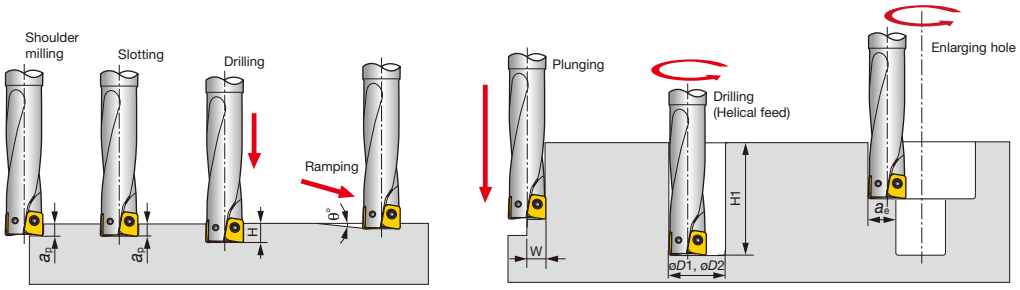


Workpiece material		Carbon steels and alloy steels		Alloy steels and prehardened steelst		Stainless steels		Cast irons		Aluminium alloys (Si < 13%)		Aluminium alloys (Si ≥ 13%)	
Hardness		< 30HRC		30 ~ 40HRC		< 250HB		–		–		–	
Cutting speed		V_c = 50 ~ 120 m/min		V_c = 30 ~ 100 m/min		V_c = 50 ~ 120 m/min		V_c = 60 ~ 140 m/min		V_c = 100 ~ 300 m/min		V_c = 100 ~ 300 m/min	
Conditions		No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min	No. of rev. n min^{-1}	Feed speed V_f mm/min
Tool dia. (mm)	ø10	2550	130	1910	80	2550	130	3180	190	6370	450	4770	290
	ø12	2120	110	1590	65	2120	110	2650	160	5300	370	3980	240
	ø16	1590	80	1190	50	1590	80	1990	120	3980	280	2980	180

Note:

- In slotting or pocketing where chips tend to stay in the cutting zone, use air blast to remove chips to prevent chip recutting.
- When chips tend to weld excessively on the cutting edge such as in machining aluminum alloys, use a water soluble cutting fluid.
- In the case of cutting a casting skin or a heavily interrupted work surface, decrease the feed per tooth and the maximum depth of cut to 1/2 to 2/3 times the values shown in the table.
- Tool overhang length must be as short as possible to avoid chatter. When the tool overhang length is long, decrease the number of revolutions and feed.
- Cutting conditions are generally limited by the rigidity and power of the machine and the rigidity of the workpiece. When setting the conditions, start from half of the values of the standard cutting conditions and then increase the value gradually while making sure that the machine is running normally.

APPLICATION RANGE

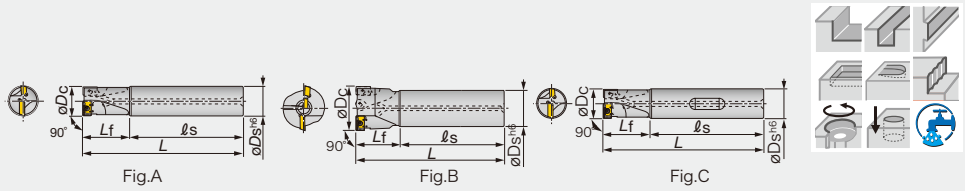


Designation	Tool dia.	Max. depth of cut ap (mm)	Max.drilling depth H (mm)	Max.cutting width in plunging W (mm)	Max. ramping angle θ°	Min. machinable hole dia. øD1(mm)	Min. machinable hole dia. øD2 (mm)	Max. cutting width in enlarging hole ae (mm)	Max.depth of boring H1 (mm)
EVH06R010M10.0-02	ø10	3	5	5	5	12	19	9	30
EVH07R012M12.0-02	ø12	3.5	6	6	5	14	23	11	36
EVH09R016M16.0-02	ø16	4.5	8	8	5	18	31	15	48

EVX

Multi purpose endmills with center edge in medium diameter

Standard type A.R. = +2°~ +5°, R.R. = -10°~ -3.5°
Long type A.R. = +5°, R.R. = -4°~ -2°



Designation	Max. ap	øDc	z	øDs	ℓs	Lf	L	Air hole	Fig.	Insert
EVX08016RSA-E	7	16	2	16	55	30	85	with	C	XXMU08...
EVX08016RLA-E	7	16	2	16	55	50	105	with	C	XXMU08...
EVX08016RSA	7	16	2	16	90	30	120	with	A	XXMU08...
EVX08016RS	7	16	2	16	90	30	120	without	A	XXMU08...
EVX08016RLA	7	16	2	16	135	40	175	with	A	XXMU08...
EVX08016RL	7	16	2	16	135	40	175	without	A	XXMU08...
EVX10020RSA-E	9	20	2	20	60	30	90	with	C	XXMU10...
EVX10020RSA	9	20	2	20	90	30	120	with	A	XXMU10...
EVX10020RS	9	20	2	20	90	30	120	without	A	XXMU10...
EVX10020RLA-E	9	20	2	20	60	60	120	with	C	XXMU10...
EVX10020RLA	9	20	2	20	135	50	185	with	A	XXMU10...
EVX10020RL	9	20	2	20	135	50	185	without	A	XXMU10...
EVX12025RSA-E	11.5	25	2	25	60	40	100	with	C	XXMU12...
EVX12025RLA-E	11.5	25	2	25	60	75	135	with	C	XXMU12...
EVX12025RSA	11.5	25	2	25	100	40	140	with	A	XXMU12...
EVX12025RS	11.5	25	2	25	100	40	140	without	A	XXMU12...
EVX12025RLA	11.5	25	2	25	150	70	220	with	A	XXMU12...
EVX12025RL	11.5	25	2	25	150	70	220	without	A	XXMU16
EVX16032RSA-E	15	32	2	25	60	50	110	with	C	XXMU16...
EVX16032RLA-E	15	32	2	25	60	95	155	with	C	XXMU16...
EVX16032RSA	15	32	2	32	110	50	160	with	A	XXMU16...
EVX16032RS	15	32	2	32	110	50	160	without	A	XXMU16...
EVX16032RLA	15	32	2	32	175	80	255	with	A	XXMU16...
EVX16032RL	15	32	2	32	175	80	255	without	A	XXMU16...
EVX12040RSA	11.5	40	2	42	120	60	180	with	B	XXMU12, WCMT05...
EVX12040RS	11.5	40	2	42	120	60	180	without	B	XXMU12, WCMT05...
EVX12040RLA	11.5	40	2	42	210	100	310	with	B	XXMU12, WCMT05...
EVX12040RL	11.5	40	2	42	210	100	310	without	B	XXMU12, WCMT05...
EVX16050RSA	15	50	2	42	160	50	210	with	B	XXMU16, WCMT06...
EVX16050RS	15	50	2	42	160	50	210	without	B	XXMU16, WCMT06...
EVX16050RLA	15	50	2	42	310	50	360	with	B	XXMU16, WCMT06...
EVX16050RL	15	50	2	42	310	50	360	without	B	XXMU16, WCMT06...
EVX16063RSA	15	63	2	42	190	50	240	with	B	XXMU16, WCMT06...
EVX16063RS	15	63	2	42	190	50	240	without	B	XXMU16, WCMT06...
EVX16063RLA	15	63	2	42	310	50	360	with	B	XXMU16, WCMT06...
EVX16063RL	15	63	2	42	310	50	360	without	B	XXMU16, WCMT06...

SPARE PARTS

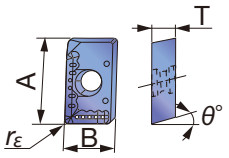
Designation	Clamping screw	Clamping screw 1	Lubricant	Wrench	Wrench 1
EVX08016R...	-	CSPB-2.2	M-1000	IP-7D	-
EVX10020R...	-	CSPB-2.5	M-1000	IP-8D	-
EVX12025R...	-	CSPD-3	M-1000	IP-10D	-
EVX16032R...	CSPB-3.5	-	M-1000	IP-15D	-
EVX12040R...	-	CSPD-3	M-1000	IP-10D	-
EVX16050, 63R...	CSPB-3.5	CSTB-3.5D	M-1000	IP-15D	T-9D

Reference pages

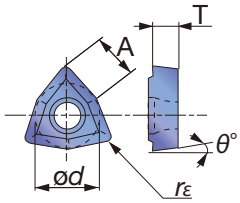
Inserts, Standard cutting conditions → **D256**

INSERT

XXMU-MJ



WCMT-D4



P	Steel	★	
M	Stainless		★
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys		
H	Hard materials		

★ : First choice
☆ : Second choice

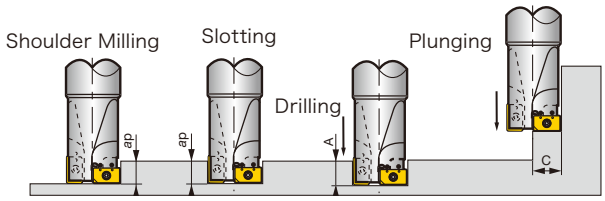
Designation	rε	Coated AH120	Coated AH140	A	ød	T	θ°	B
XXMU08T204PR-MJ	0.4	●	●	8.2	-	2.78	10	5.6
XXMU10H308PR-MJ	0.8	●	●	10.6	-	3.5	11	6.8
XXMU12X408PR-MJ	0.8	●	●	13.2	-	4.2	11	7.9
XXMU16X508PR-MJ	0.8	●	●	16.8	-	5	11	11.1
WCMT050308-D4	0.8	●	●	5.4	7.94	3.18	7	-
WCMT06T308-D4	0.8	●	●	6.5	9.525	3.97	7	-

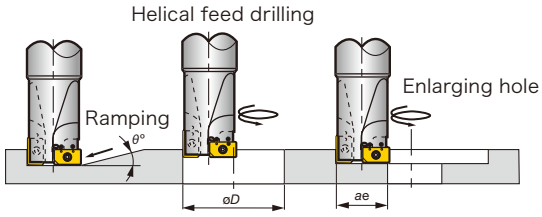
●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	øD: ø16 ~ ø20 mm Cutting speed Vc (m/min)	Feed per tooth fz (mm/t) Shouldering·Grooving	Feed per tooth fz (mm/t) Drilling	øD: ø25 ~ ø63 mm Cutting speed Vc (m/min)	Feed per tooth fz (mm/t) Shouldering·Grooving	Feed per tooth fz (mm/t) Drilling
P	Carbon steels C55, etc. < 300 HB	AH120	100 ~ 180	0.05 ~ 0.2	0.03 ~ 0.08	120 ~ 200	0.08 ~ 0.25	0.05 ~ 0.1
P	Alloy steels 42CrMo4, etc. < 300 HB	AH120	80 ~ 160	0.05 ~ 0.15	0.03 ~ 0.08	100 ~ 180	0.08 ~ 0.2	0.05 ~ 0.1
P	Die steels X96CrMoV12, etc. < 300 HB	AH120	60 ~ 120	0.05 ~ 0.13	0.03 ~ 0.06	80 ~ 150	0.08 ~ 0.15	0.03 ~ 0.08
M	Stainless steels X5CrNi18 9, etc.	AH140	70 ~ 140	0.05 ~ 0.15	0.03 ~ 0.08	90 ~ 160	0.08 ~ 0.2	0.03 ~ 0.08
K	Cast irons 250, etc.	AH120	100 ~ 180	0.05 ~ 0.25	0.03 ~ 0.1	120 ~ 200	0.08 ~ 0.25	0.05 ~ 0.1

APPLICATION RANGE

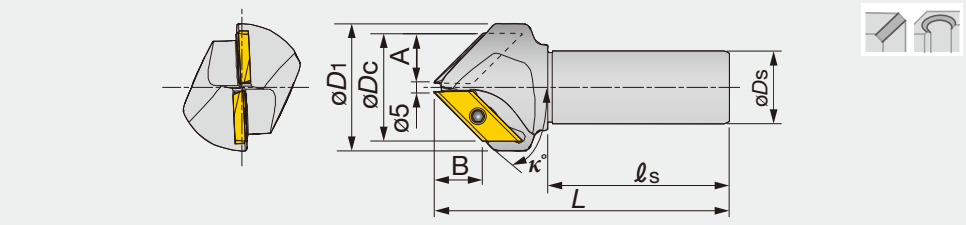




	Designation	Tool diameter *øDc*	Max. depth of cut (*ap*)	Max. drilling depth (A)	Max. cutting width in plunging (C)	Max. ramping angle (*θ*°)	Min. machining hole dia. (*øDmin*)	Max. machining hole dia. (*øDmax*)	Max. cutting width in enlarging hole (*ae*)
Standard type / Long type	EVX08016R...	16	7	8	8	3°	19.2	30	14
	EVX10020R...	20	9	10	10	3°	24	38	18
	EVX12025R...	25	11.5	12.5	12.5	3°	30	48	23
	EVX16032R...	32	15	16	16	3°	38.4	62	30
	EVX12040RS/L (A)	40	11.5	20	20	3°	48	78	38
	EVX16050RS/L (A)	50	15	25	25	3°	60	98	48
	EVX16063RS/L (A)	63	15	31.5	31.5	3°	75.6	124	61

ECC31

Indexable chamfering cutter with large parallelogram insert



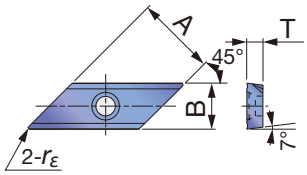
Designation	øDc	z	κ°	øD1	A	B	øDs	ℓs	L	Insert
ECC31005R-30	34	1	30	40	14.5	25.5	32	80	130.2	XCET3104...
ECC31005R-45	46	2	45	56	20.5	20.5	32	80	130.1	XCET3104...
ECC31005R-60	55	2	60	72	25.5	14.5	32	80	130.1	XCET3104...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench
ECC31...	CSTB-5S	M-1000	T-20D

INSERT

XCET31



		Coated		Cermet		Un-coated	
P	Steel	☆		★		☆	
M	Stainless	★					
K	Cast iron	★					
N	Non-ferrous						
S	Superalloys						
H	Hard meterials						

★ : First choice
☆ : Second choice

Designation	rε	AH330	NS740	UX30	A	B	T
XCET310404ER	0.4	●	●	●	22	12.7	4.5

●: Line up

STANDARD CUTTING CONDITIONS

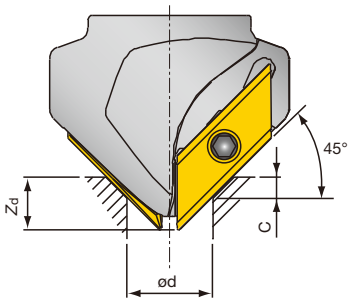
ISO	Workpiece material	Grade	No. of revolutions: n (min^{-1})	Feed per tooth: fz (mm/t)
P	Carbon steels C55, etc. Alloy steels 42CrMo4, etc. < 300 HB	NS740	1000 - 3000 - 7000	0.1 - 0.25
		UX30	700 - 2000 - 4900	0.1 - 0.25
	Die steels X40CrMoV5-1, etc. < 300 HB	AH330	1000 - 3000 - 7000	0.1 - 0.2
M	Stainless steels X5CrNi18-10, etc. < 250 HB	AH330	1000 - 3000 - 7000	0.1 - 0.25
K	Cast irons 250, etc.	AH330	1000 - 3000 - 7000	0.1 - 0.25

Notes:
- When the hole diameter to be chamfered is small or the cutting edges near the front end of tool are used, use at higher side of the revolution range shown in the Table.
  In contrast, when the hole diameter to be chamfered is large or the cutting edges far from the tool's front end are used, use the lower side of the revolution range shown in the Table.
- When chamfering a small diameter hole (smaller than ø10 mm) in a plunge-milling mode, peck-feeding should not be used.
- When the hole diameter to be chamfered is smaller than ø10 mm or the cutting edges near the tool's front end are used, the feed should be set within 0.15 mm/t.

Guidelines for programming

Z-axis plunging depth Z_d (mm) in 45° chamfering of hole

Hole dia. ød (mm)	Size of chamfering C (mm) 0.5	1	1.5	2	3	4	5
5	0.7	1.2	1.7	2.2	3.2	-	-
6	1.2	1.7	2.2	2.7	3.7	-	-
6.8	1.6	2.1	2.6	3.1	4.1	-	-
8	2.2	2.7	3.2	3.7	4.7	-	-
8.5	2.4	2.9	3.4	3.9	4.9	-	-
10	3.2	3.7	4.2	4.7	5.7	6.7	7.7
10.2	3.3	3.8	4.3	4.8	5.8	6.8	7.8
12	4.2	4.7	5.2	5.7	6.7	7.7	8.7
14	5.2	5.7	6.2	6.7	7.7	8.7	9.7
16	6.2	6.7	7.2	7.7	8.7	9.7	10.7
17.5	6.9	7.4	7.9	8.4	9.4	10.4	11.4
20	8.2	8.7	9.2	9.7	10.7	11.7	12.7
21	8.7	9.2	9.7	10.2	11.2	12.2	13.2
24	10.2	10.7	11.2	11.7	12.7	13.7	14.7
30	13.2	13.7	14.2	14.7	15.7	16.7	17.7
33	14.7	15.2	15.7	16.2	17.2	18.2	19.2
36	16.2	16.7	17.2	17.7	18.7	19.7	-
42	19.2	19.7	20.2	-	-	-	-

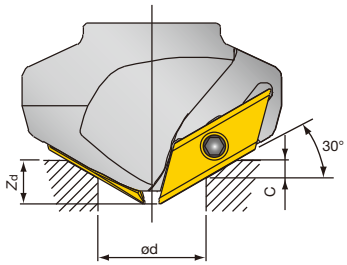


Tool: ECC31005R-45

Note: When the hole depth is smaller than the Z-axis plunging depth (Zd), special care should be taken to avoid an interference between the tool's front end and the bottom of the hole.

Z-axis plunging depth Z_d (mm) in 30° chamfering of hole

Hole dia. ød (mm)	Size of chamfering C (mm) 0.5	1	1.5	2	2.5	3	3.5
5	0.6	1.1	1.6	2.1	-	-	-
6	0.9	1.4	1.9	2.4	-	-	-
6.8	1.1	1.6	2.1	2.6	-	-	-
8	1.4	1.9	2.4	2.9	-	-	-
8.5	1.6	2.1	2.6	3.1	-	-	-
10	2	2.5	3	3.5	4	4.5	5
10.2	2.1	2.6	3.1	3.6	4.1	4.6	5.1
12	2.6	3.1	3.6	4.1	4.6	5.1	5.6
16	3.7	4.2	4.7	5.2	5.7	6.2	6.7
17.5	4.2	4.7	5.2	5.7	6.2	6.7	7.2
20	4.9	5.4	5.9	6.4	6.9	7.4	7.9
21	5.2	5.7	6.2	6.7	7.2	7.7	8.2
24	6.1	6.6	7.1	7.6	8.1	8.6	9.1
30	7.8	8.3	8.8	9.3	9.8	10.3	10.8
33	8.7	9.2	9.7	10.2	10.7	11.2	11.7
36	9.5	10	10.5	11	11.5	12	12.5
38	10.1	10.6	11.1	11.6	12.1	12.6	13.1
42	11.2	11.7	12.2	12.7	13.2	13.7	14.2
46	12.4	12.9	13.4	13.9	14.4	-	-
48	13	13.5	14	14.5	-	-	-
52	14.1	-	-	-	-	-	-

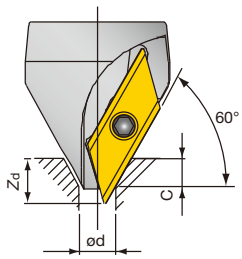


Tool: ECC31005R-60

Note: When the hole depth is smaller than the Z-axis plunging depth (Zd), special care should be taken to avoid an interference between the tool's front end and the bottom of the hole.

Z-axis plunging depth Z_d (mm) in 60° chamfering of hole

Hole dia. ød (mm)	Size of chamfering C (mm) 0.5	1	1.5	2	2.5	3	3.5	4
5	0.8	1.3	1.8	2.3	2.8	-	-	-
6	1.7	2.2	2.7	3.2	3.7	-	-	-
6.8	2.4	2.9	3.4	3.9	4.4	-	-	-
8	3.4	3.9	4.4	4.9	5.4	-	-	-
8.5	3.8	4.3	4.8	5.3	5.8	-	-	-
10	5.1	5.6	6.1	6.6	7.1	7.6	8.1	8.6
10.2	5.3	5.8	6.3	6.8	7.3	7.8	8.3	8.8
12	6.9	7.4	7.9	8.4	8.9	9.4	9.9	10.4
16	10.3	10.8	11.3	11.8	12.3	12.8	13.3	13.8
17.5	11.6	12.1	12.6	13.1	13.6	14.1	14.6	15.1
20	13.7	14.2	14.7	15.2	15.7	16.2	16.7	17.2
21	14.6	15.1	15.6	16.1	16.6	17.1	17.6	18.1
24	17.2	17.7	18.2	18.7	19.2	19.7	20.2	20.7
30	22.4	22.9	23.4	23.9	24.4	24.9	25.4	-
33	24.9	25.4	-	-	-	-	-	-

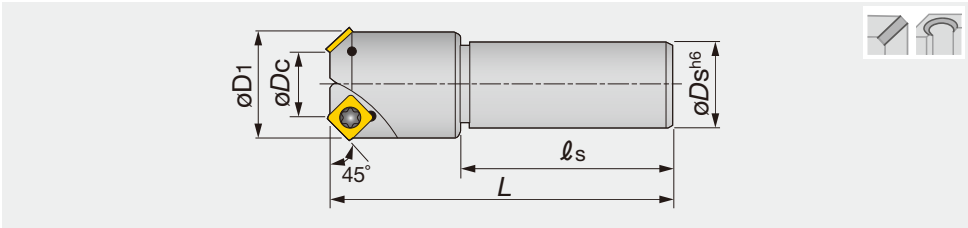


Tool: ECC31005R-30

Note: When the hole depth is smaller than the Z-axis plunging depth (Zd), special care should be taken to avoid an interference between the tool's front end and the bottom of the hole.

ECP4400R

Indexable chamfering cutter with square insert



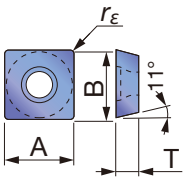
Designation	øDc	z	øD1	øDs	L	ℓs	Insert
ECP440AR	10	1	27.5	32	130	80	SPMA422*N
ECP4423R	23	2	40.3	32	130	80	SPMA422*N
ECP4436R	36	3	53.3	32	130	80	SPMA422*N

SPARE PARTS

Designation	Clamping screw	Wrench
ECP44...	CSTA-4	T-15D

INSERT

SPMA42



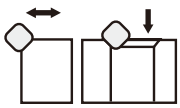
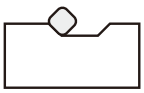
		Cermet			Uncoated		
P	Steel	★	☆		☆		
M	Stainless						
K	Cast iron					★	
N	Non-ferrous						
S	Superalloys						
H	Hard meterials						

★ : First choice
☆ : Second choice

Designation	rε	NS740	N308		UX30	TH10									A	B	T
SPMA422TN	0.8	●	●		●										12.7	12.7	3.18
SPMA422FN	0.8					●									12.7	12.7	3.18

●: Line up

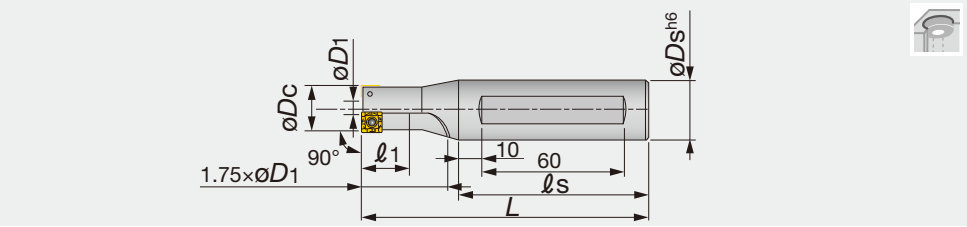
STANDARD CUTTING CONDITIONS

Operations		Workpiece material	Grade	Cutting speed Vc (m/min)	Maximum depth of cut ap (mm)	Feed per tooth fz (mm/t)
Single or double chamfering hole chamfering 	P	Carbon steels, Alloy steels < 300HB	NS740 · N308 UX30	100 - 150	-	0.2 - 0.5
	P	Die steels < 30HRC	NS740 · N308 UX30	50 - 70	-	0.15 - 0.4
	K	Cast irons	TH10	90 - 110	-	0.2 - 0.6
Facing Grooving 	P	Carbon steels, Alloy steels < 300HB	NS740 · N308 UX30	100 - 150	3	0.1 - 0.15
	P	Die steels < 30HRC	UX30	50 - 70	2	0.1 - 0.15
	K	Cast irons	TH10	90 - 110	3	0.1 - 0.15

Notes:
- When chamfering stainless steel, down-milling is recommended. Conventional milling may cause edge chipping.
- When chamfering above C3.0, the feed per tooth should be set at the lower side of the value shown in the above table.

TCB

Indexable counter boring endmill



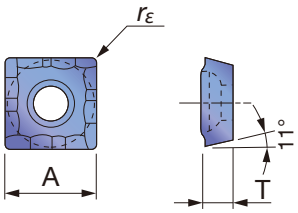
Designation	øDc	z	øD1	ℓ1	L	ℓs	øDs	Insert
TCB-140	14	1	4	18	117	80	25	SPMP831DS
TCB-175	17.5	2	7.1	22	115	80	25	SPMP831DS
TCB-200	20	2	8.2	25	120	80	25	SPMP042ERD
TCB-230	23	2	11	29	126	80	25	SPMP042ERD
TCB-260	26	2	14	33	132	80	32	SPMP042ERD
TCB-290	29	2	14	30	138	80	32	SPMM322ERD
TCB-320	32	2	16.9	-	144	80	32	SPMM322ERD
TCB-350	35	2	14	-	150	80	32	SPMM432ERD
TCB-390	39	2	17.9	-	158	80	32	SPMM432ERD
TCB-430	43	2	21.7	-	171	85	42	SPMM432ERD

SPARE PARTS

Designation	Clamping screw	Wrench
TCB-140	CSTB-2.2S	T-7D
TCB-175	CSTB-2.2	T-7D
TCB-200 - 260	CSTA-NO3	T-9D
TCB-290, 320	CSTA-NO5	T-9D
TCB-350 - 430	CSTA-4	T-15D

INSERT

SPMP/SPMM



P	Steel	★	
M	Stainless	★	
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys		
H	Hard meterials		

★ : First choice
☆ : Second choice

Designation	rε	Coated T313W	A	T
SPMP831DS	0.4	●	6.35	2.38
SPMP042ERD	0.8	●	7.938	3.18
SPMM322ERD	0.8	●	9.525	3.18
SPMM432ERD	0.8	●	12.7	4.76

●: Line up

Reference pages

Standard cutting conditions → **D262**

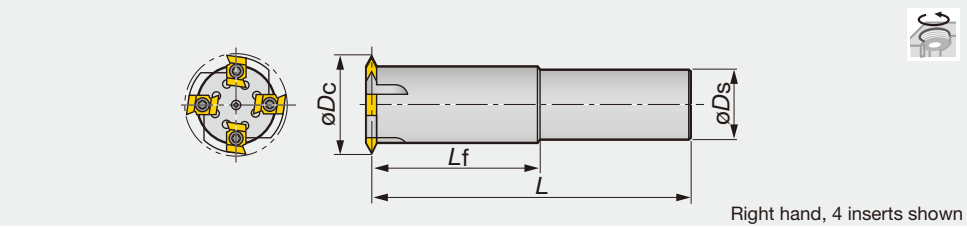
STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Grade	Cutting speed *Vc* (m/min)	Feed *f* (mm/rev)	Cutting fluid
P	Carbon steels	T313W	80 - 150	0.12 - 0.24	Water soluble type
M	Stainless steels, Mild steels	T313W	150 - 200	0.05 - 0.12	Water soluble type
K	Cast irons	T313W	70 - 130	0.2 - 0.4	Water soluble type or dry cutting

Notes :
- For cutters under 20 mm diameter, be sure to use a cutting fluid and select lower cutting speeds than shown above.
- For TCB-140 type, reduce the feeds to 1/2 of the values shown in the table.

Single tooth threading mills

Indexable threading mills



Right hand, 4 inserts shown

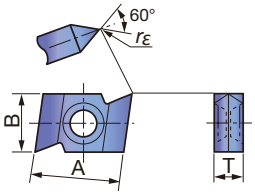
Designation	øDc	z	øDs	Lf	L	Range of internal thread	Insert
D23-D25-45R	23	1	25	45	115	M28 - M30	T1-R...
D25-D25-45R	25	1	25	45	115	M32 - M42	T1-R...
D38-D32-85R	38	2	32	85	165	M45 - M56	T1-R...
D50-D42-100R	50	4	42	100	190	M58 - M68	T1-R...
D55-D42-100R	55	4	42	100	190	M64 - M85	T2-R...
D60-D42-100R	60	4	42	100	190	M70 - M85	T2-R...
D80-D42-100R	80	6	42	100	190	M90 -	T2-R...

SPARE PARTS

Designation	Clamping screw	Wrench
D23-D25... - D50-D42...	CSTB-4	T-15F
D55-D42... - D80-D42...	CSTB-5	T-20F

INSERT

T*-R...



		GH330
P	Steel	★
M	Stainless	★
K	Cast iron	
N	Non-ferrous	
S	Superalloys	
H	Hard meterials	

★ : First choice
☆ : Second choice

Designation	rε	GH330 (Coated)	A	B	T
T1-R14	0.14	●	14.4	9.525	4.76
T1-R28	0.28	●	14.4	9.525	4.76
T2-R14	0.14	●	17.8	12.7	6.35
T2-R28	0.28	●	17.8	12.7	6.35

●: Line up

STANDARD CUTTING CONDITIONS

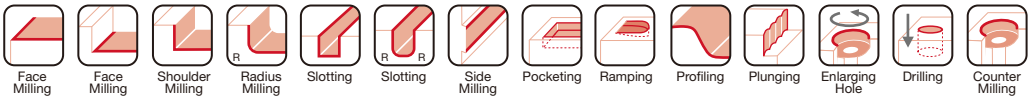
ISO	Workpiece material	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Mild steels / Unharded steels < 200HB	GH330	150 ~ 200	0.3 ~ 0.4
	Carbon steels / Alloy steels < 300HB	GH330	150 ~ 200	0.17 ~ 0.26
	Die steels < 50HRC	GH330	30 ~ 50	0.14 ~ 0.2
M	Stainless steels < 300HB	GH330	150 - 200	0.05 - 0.12

- Climb milling is recommended.
- When threading a blind hole, use the right hand cutter in right-hand rotation. Cut up from the bottom to prevent chip recutting.
- When machining internal threads from the mouth, use the left-hand cutter in left-hand rotation.

MEMO

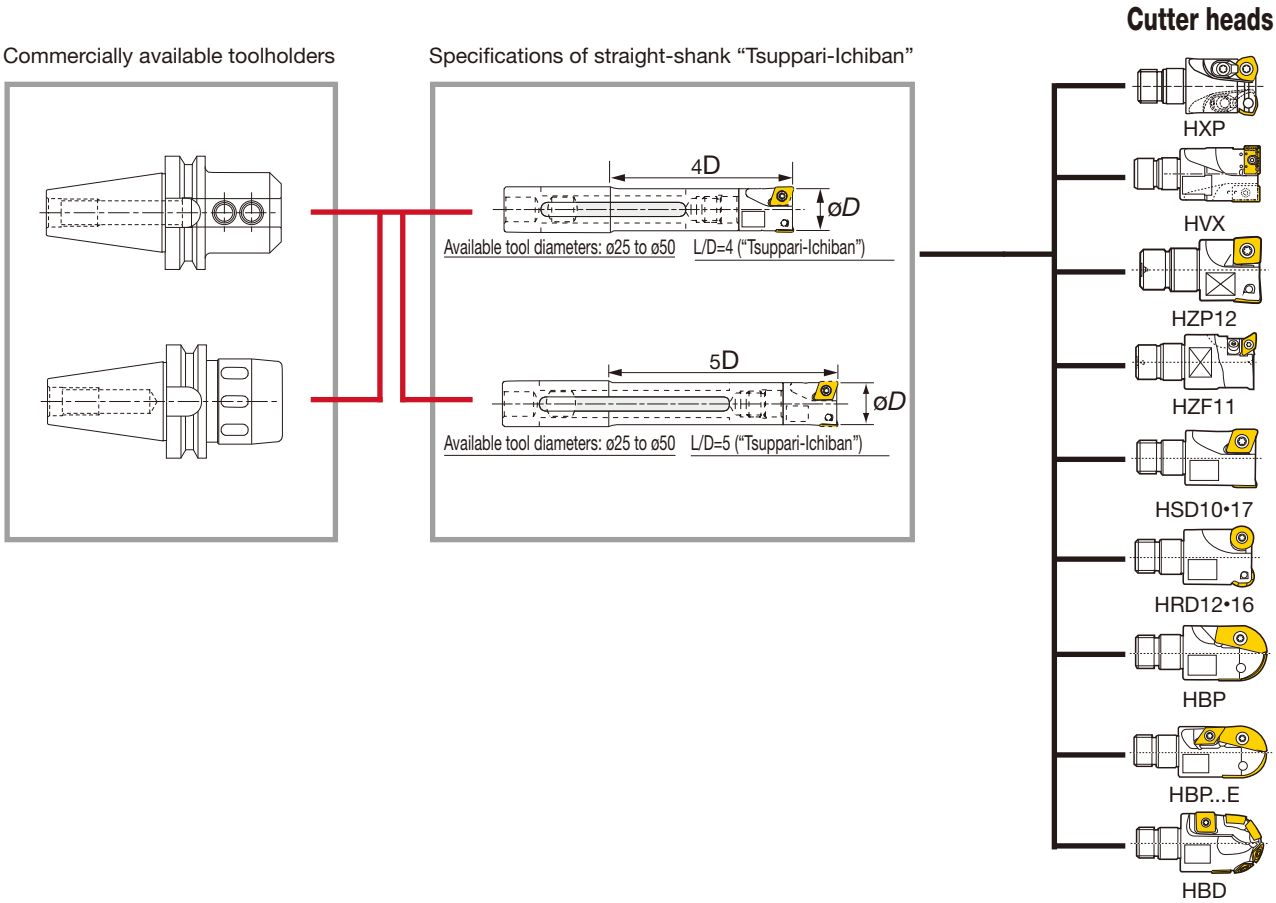
TMS

"Tsuppari-Ichiban" Modular tool system



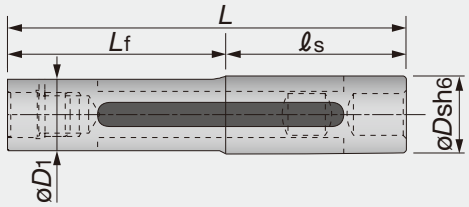
- **Interchangeable head design allows easy tool management and helps select an optimum tool.**
- **"Tsuppari-Ichiban" shank performs high efficiency machining even in long-reach applications.**

Modular straight shank system



TMS straight shank

T-Bar Modular System (TMS) with straight shank

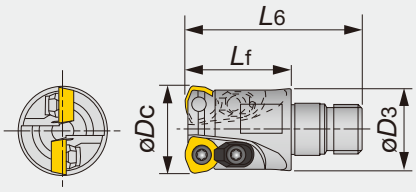


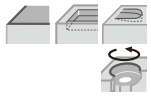
Designation	øDs	øD1	L	ℓs	Lf	Cutter
HD02525L128T	25	23	128	58	70	H...25
HD02525L153T	25	23	153	58	95	H...25
HD03032L145T	32	28	145	65	80	HBP030
HD03032L175T	32	28	175	65	110	HBP030
HD03232L163T	32	30	163	65	98	H...32
HD03232L195T	32	30	195	65	130	H...32
HD04042L182T	42	38	182	72	110	H...40
HD04042L222T	42	38	222	72	150	H...40
HD05042L222T	42	42	222	150	72	H...50
HD05042L272T	42	42	272	150	122	H...50

HXP

Super high feed endmills with T-Bar Modular System (TMS)

A.R. = +4° ~ +5°, R.R. = -6° ~ -35°





Designation	øDc	z	L6	Lf	øD3	Insert	(Option) Wrench
HXP06025R	25	2	50	30	23	WPM*06X415ZP...	KS-21
HXP06026R	26	2	50	30	23	WPM*06X415ZP...	KS-21
HXP06032R	32	2	64	35	30	WPM*06X415ZP...	KS-27
HXP06032RB	32	3	64	35	30	WPM*06X415ZP...	KS-27
HXP06033R	33	2	64	35	30	WPM*06X415ZP...	KS-27
HXP06033RB	33	3	64	35	30	WPM*06X415ZP...	KS-27
HXP06040R	40	3	84	50	38	WPM*06X415ZP...	KS-32
HXP08040R	40	2	84	50	38	WPMT080615Z*R...	KS-32
HXP06050R	50	4	88	50	42	WPM*06X415ZP...	KS-36
HXP08050R	50	3	88	50	42	WPMT080615Z*R...	KS-36
HXP09050R	50	2	88	50	42	WPMT090725Z*R...	KS-36

SPARE PARTS

Designation	Clamping screw	Lubricant	Clamp set	Wrench	Wrench 1
HXP06025R - HXP06050R	CSPB-4S	M-1000	CSY-15	IP-15D	-
HXP08040R, HXP08050R	CSTB-5	M-1000	CSX20	-	T-20T
HXP09050R	CSPB-5	M-1000	CSY-20	-	IP-20T

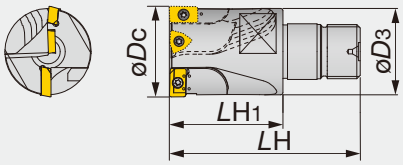
Reference pages

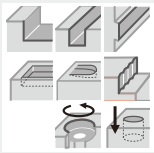
HXP: Inserts → **D028**, Standard cutting conditions → **D029 -**

HVX

Multi purpose endmills with center edge in medium diameter, with T-Bar Modular System (TMS)

A.R. = 0° ~ +20°, R.R. = -6° ~ 1°





Designation	øDc	z	LH	LH1	øD3	Shank	Insert 1	Insert 2
HVX12025R	25	2	55	35	23	HD..., HBT...	XXMU12X408PR-MJ	-
HVX16032R	32	2	69	40	30	HD..., HBT...	XXMU16X508PR-MJ	-
HVX12040R	40	2	84	50	38	HD..., HBT...	XXMU12X408PR-MJ	WCMT050308-D4
HVX16050R	50	2	88	50	42	HD..., HBT...	XXMU16X508PR-MJ	WCMT06T308-D4

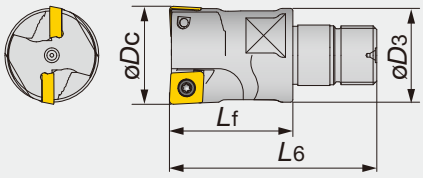
SPARE PARTS

Designation	Clamping screw	Clamping screw 1	Lubricant	Wrench	Wrench 1	WRENCH 2
HVX12025R	-	CSPD-3	M-1000	IP-10D	-	KS-21
HVX16032R	CSPB-3.5	-	M-1000	IP-15D	-	KS-27
HVX12040R	-	CSPD-3	M-1000	IP-10D	-	KS-32
HVX16050R	CSPB-3.5	CSTB-3.5D	M-1000	IP-15D	T-9D	KS-36

HZP

"Z-feed" plunging cutter for roughing operation with screw clamp, with T-Bar Modular System (TMS)

A.R. = +26°, R.R. = -2°



Designation	øDc	z	L6	Lf	øD3	Shank	Insert
HZP12032R	32	2	59	30	30	HD..., HBT...	APMT120416PR-MJ
HZP12040R	40	2	84	50	38	HD..., HBT...	APMT120416PR-MJ

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench	WRENCH 1
HZP12032R	CSTB-3.5T	M-1000	T-20D	KS-27
HZP12040R	CSTB-3.5T	M-1000	T-20D	KS-32

Reference pages

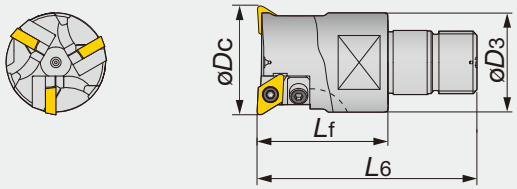
HVX: Inserts, Standard cutting conditions → **D256**

HZP: Inserts → **D218**, Standard cutting conditions → **D219**

HZF

"Z-feed" plunging endmill for finishing operation, with T-Bar Modular System (TMS)

A.R. = 0°, R.R. = 0°



Designation	øDc	z	L6	Lf	øD3	Shank	Insert
HZF11032R	32	2	59	30	30	HD..., HBT...	DPCW11T3ZFR
HZF11040R	40	3	84	50	38	HD..., HBT...	DPCW11T3ZFR

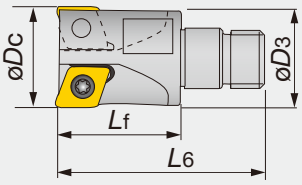
SPARE PARTS

Designation	Clamping screw	Cartridge	Adjusting screw	Lubricant	Cartridge clamping screw	Wrench	Wrench 1	Wrench 2	Wrench 3
HZF11032R	CSTB-4S	SDUPR09CZ-11	-	M-1000	-	T-15D	-	-	KS-27
HZF11040R	CSTB-4S	SDUPR09CZ-11	SSHM3-10	M-1000	CM4X0.7X12	T-15D	P-1.5	P-3	KS-32

HSD

Multi purpose square endmills, with T-Bar Modular System (TMS)

A.R. = +25°, R.R. = -6° ~ 0°



Designation	øDc	z	L6	Lf	øD3	Shank	Insert
HSD10025R	25	2	50	30	23	HD..., HBT...	GD*T10H3PD...
HSD10032R	32	2	59	50	30	HD..., HBT...	GD*T10H3PD...
HSD10040R	40	3	84	50	38	HD..., HBT...	GD*T10H3PD...
HSD17040R	40	2	84	50	38	HD..., HBT...	GD*T17X6PD...
HSD10050R	50	3	88	50	42	HD..., HBT...	GD*T10H3PD...
HSD17050R	50	2	88	50	42	HD..., HBT...	GD*T17X6PD...

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench	Wrench 1
HSD10025R	CSTB-3.5H	M-1000	T-15D	KS-21
HSD10032R	CSTB-3.5H	M-1000	T-15D	KS-27
HSD10040R	CSTB-3.5H	M-1000	T-15D	KS-32
HSD17040R	CSTB-5	M-1000	T-20D	KS-32
HSD10050R	CSTB-3.5H	M-1000	T-15D	KS-36
HSD17050R	CSTB-5	M-1000	T-20D	KS-36

Reference pages

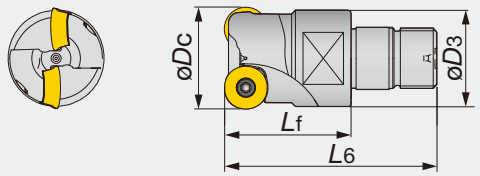
HZF: Inserts → **D220**, Standard cutting conditions → **D221**

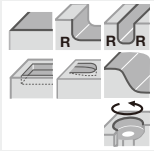
HSD: Inserts, Standard cutting conditions → **D105**

HRD

Indexable endmills with button insert of 6 mm or 8 mm radius, with T-Bar Modular System (TMS)

A.R. = +21° ~ +23°, R.R. = -6° ~ -4°





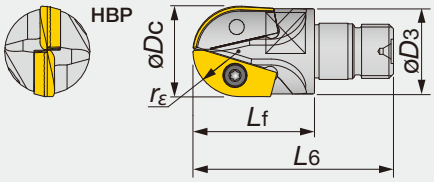
Designation	øDc	z	L6	Lf	øD3	Shank	Insert
HRD12032R	32	2	59	30	30	HD..., HBT...	RDM*1204ZD*N(-MJ)
HRD12040R	40	3	84	50	38	HD..., HBT...	RDM*1204ZD*N(-MJ)
HRD16040R	40	2	84	50	38	HD..., HBT...	RDM*1606ZD*N(-MJ)
HRD12050R	50	4	88	50	42	HD..., HBT...	RDM*1204ZD*N(-MJ)
HRD16050R	50	3	88	50	42	HD..., HBT...	RDM*1606ZD*N(-MJ)

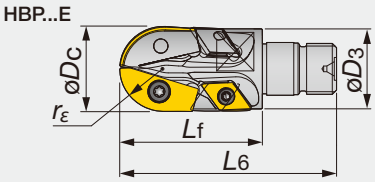
SPARE PARTS

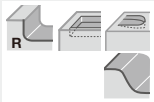
Designation	Clamping screw	Lubricant	Wrench	Wrench 1
HRD12032R	CSTB-3.5	M-1000	T-15D	KS-27
HRD12040R	CSTB-3.5	M-1000	T-15D	KS-32
HRD16040R	CSTB-5	M-1000	T-20D	KS-32
HRD12050R	CSTB-3.5	M-1000	T-15D	KS-36
HRD16050R	CSTB-5	M-1000	T-20D	KS-36

HBP

Indexable ball-nose endmill for semi-finishing, with T-Bar Modular System (TMS)







Designation	øDc	z	L6	Lf	øD3	Shank	Insert 1	Insert 2
HBP025	25	2	55	35	23	HD..., HBT...	ZPET2505-MJ	-
HBP025E	25	2 (4)	65	45	23	HD..., HBT...	ZPET2505-MJ	DCMW11T304TN
HBP030	30	2	66	40	28	HD..., HBT...	ZPET3006-MJ	-
HBP030E	30	2 (4)	76	50	28	HD..., HBT...	ZPET3006-MJ	DCMW11T304TN

SPARE PARTS

Designation	Clamping screw	Clamping screw 1	Lubricant	Wrench	Wrench 1	Wrench 2
HBP025*	CSTB-4S	-	M-1000	T-15D	-	KS-21
HBP030	CSTB-5S	-	M-1000	T-20D	-	KS-24
HBP030E	CSTB-4S	CSTB-5S	M-1000	T-15D	T-20D	KS-24

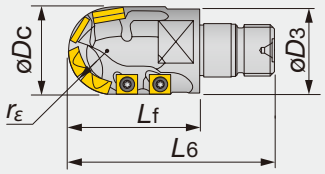
Reference pages

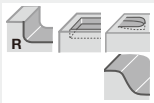
HRD: Inserts, Standard cutting conditions → **D205**

HBP: Inserts → **D212**, Standard cutting conditions → **D215**

HBD

Indexable ball-nose endmill for roughing, with T-Bar Modular System (TMS)





Designation	øDc	z	L6	Lf	øD3	Shank	Insert 1	Insert 2
HBD040E	40	2(7)	94	60	38	HD..., HBT...	ZDMT4005-MJ	SCMT09T308-23
HBD050E	50	2(7)	113	75	42	HD..., HBT...	ZDMT5006-MJ	SCMT120408-23

SPARE PARTS

Designation	Clamping screw	Lubricant	Wrench	Wrench 1
HBD040E	CSTB-4M	M-1000	T-15T	KS-32
HBD050E	CSTB-5	M-1000	T-20T	KS-36

Reference pages

HBD: Inserts → **D214**, Standard cutting conditions → **D215**

MEMO

Identification System SOLIDMEISTER Designation

① Solid Carbide Endmill Code

② Endmill type	
C	Square endmill
CA	Square endmill for aluminium
CC	Square endmill with chamfered
CH	Square endmill for finishing
B	Ball nose
FF	High feed
FS	FinishMeister
CP	Chip splitter
CR/RC/RF	Rougher
TR	Tapered & radius
BRF	Ball nose & rougher

③ Cutting diameter (mm)	
004	0.4
045	4.5
100	10

①	②	③				⑥
TE	C	009	A	2	-	0135
TE	C	100	E	4L	-	22
			④	⑤		⑥

④ Helix angle	
N	0°
C	10°
T	20°
A	30°
E	38°
B	45°
D	50°
F	55°
H	Variable helix

⑤ No. of flutes	
2	2 flutes
3	3 flutes
4	4 flutes
4M	4 flutes & medium length
4L	4 flutes & long length
4X	4 flutes & extra long length
4MF	4 flutes & medium length for hardened steel
44	4 variable pitch flutes

⑥ Effective cutting length (mm)	
006	0.6
0135	1.35
06	6
20	20

Tungaloy Premium PVD Coated Grades

Tungaloy has achieved remarkable gains in metal removal rates and tool life with solid carbide endmills with a PVD coating, on a very tough submicron substrate.
These new materials provide high toughness and resistance to micro-cracks and chipping.

* TiAlN on a submicron substrate = AH725
* TiAlN on ultra-fine grain substrate = AH750

Diameter range	Cutting diameter $øD^{e8}$	Shank $ød^{h6}$
< 3	-0.014 - 0.028	0 - 0.007
3 - 6	-0.02 - 0.038	0 - 0.008
6 - 10	-0.025 - 0.047	0 - 0.009
10 - 18	-0.032 - 0.059	0 - 0.011
18 - 30	-0.04 - 0.073	0 - 0.013

/04	4
/10 /1.5	10 / 1.5°
/14	14

⑦ Length of neck / Angle neck (mm)

C	Cylindrical
W	Weldon

⑧ Shank type

055	5.5
08	8
4	4

⑨ Shank diameter (mm)

⑦	⑧	⑨		
/06	C	4	M	E66
/32	C	10	CF-	72
			⑩	⑪

⑩ Workpiece material / Additional feature	
-	General
S	Stainless steel
M	Steel medium hardness ≤ 55 HRC
H	Steel high hardness ≥ 55 HRC
R02A	Aluminium
CF	VARIABLEMEISTER
R16	Corner radius: 1.6

⑪ Overall length / Corner radius	
66	66 mm
180	180 mm
E**	Eco type
M	Medium
R08	Corner radius: 0.8

AH725

- High thermal and chemical stability.
- High hardness 3500 HV makes higher speeds, machining of harder materials, and dry machining possible. The TiAlN coating can be applied at 800° C.
- Recommended for hardened steel, high-temperature and steel alloys.
- Improves and expedites finishing on dies and molds.
- Longer tool life in high speed machining.

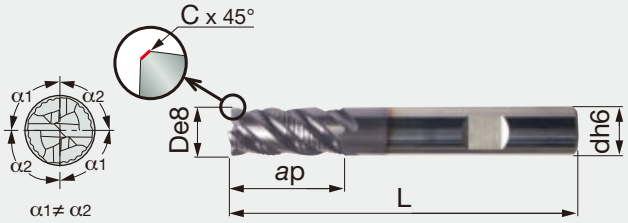
AH750

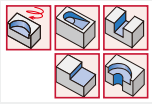
- Excellent for machining hard steel up to 70 HRC and high temperature alloys.
- The small grain size improves cutting edge strength and tends to chip less.

FINISHMEISTER VARIABLEMEISTER

TEFS**E44-**CF...

4 flutes, 38° helix, variable pitch, combination, medium length



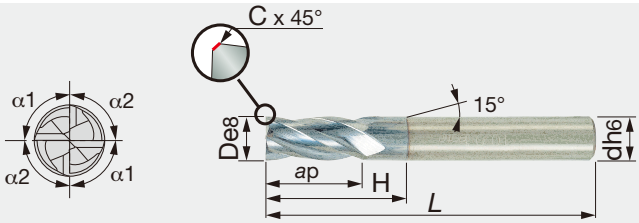


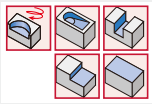
Designation	AH725	D	d	C	ap	L	Shank
TEFS060E44-14W06CF-57	●	6	6	0.25	14	57	Weldon
TEFS080E44-18W08CF-63	●	8	8	0.3	18	63	Weldon
TEFS100E44-22W10CF-72	●	10	10	0.4	22	72	Weldon
TEFS120E44-26W12CF-83	●	12	12	0.5	26	83	Weldon
TEFS140E44-30W14CF-83	●	14	14	0.5	30	83	Weldon
TEFS160E44-34W16CF-92	●	16	16	0.6	34	92	Weldon
TEFS200E44-42W20CF-104	●	20	20	0.6	42	104	Weldon
TEFS250E44-52W25CF-121	●	25	25	0.6	52	121	Weldon

VARIABLEMEISTER

TEC**E*L-**CF...

4 flutes endmill, 38° helix, variable pitch for chatter dampening





Designation	AH725	D	d	C	ap	H	L	Shank
TEC030E4L-8/11C06CF-57	●	3	6	0.1	8	11	57	Cylindrical
TEC040E4L-10/14C06CF-57	●	4	6	0.15	10	14	57	Cylindrical
TEC050E4L-12/17C06CF-57	●	5	6	0.18	12	17	57	Cylindrical
TEC060E4L-14/20C06CF-57	●	6	6	0.25	14	20	57	Cylindrical
TEC080E4L-18/26C08CF-63	●	8	8	0.3	18	26	63	Cylindrical
TEC100E4L-22/32C10CF-72	●	10	10	0.4	22	32	72	Cylindrical
TEC120E4L-26/38C12CF-83	●	12	12	0.5	26	38	83	Cylindrical
TEC160E4L-34/50C16CF-100	●	16	16	0.6	34	50	100	Cylindrical
TEC200E4L-42/60C20CF-125	●	20	20	0.6	42	60	125	Cylindrical
TEC250E4L-52/65C25CF-121	●	25	25	0.6	52	65	121	Cylindrical

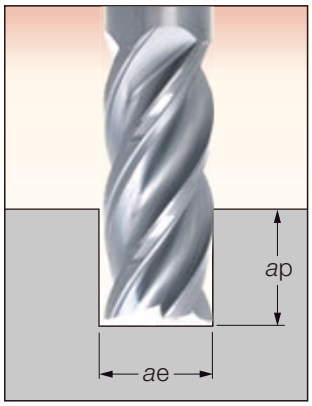
5 flutes endmill, 38° helix, variable pitch for chatter danpening, medium length endmills

Designation	AH725	D	d	C	ap	H	L	Shank
TEC060E5L-15C06CF-57	●	6	6	0.2	15	-	57	Cylindrical
TEC080E5L-20C08CF-63	●	8	8	0.25	20	-	63	Cylindrical
TEC100E5L-25C10CF-72	●	10	10	0.3	25	-	72	Cylindrical
TEC120E5L-30C12CF-83	●	12	12	0.4	30	-	83	Cylindrical
TEC160E5L-40C16CF-100	●	16	16	0.5	40	-	100	Cylindrical
TEC200E5L-50C20CF-125	●	20	20	0.5	50	-	125	Cylindrical

For recommended feed, see next page.

●: Line up

Recommended feed - VariableMeister solid carbide endmills



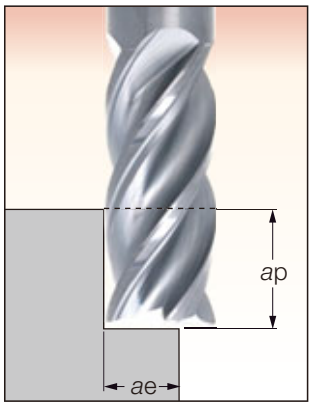
ae = D

ap = D × 0.5 ~ 1

øD	Min. *fz*	Max. *fz*
6	0.025	0.06
8	0.03	0.08
10	0.03	0.09
12	0.035	0.1
16	0.05	0.12
20	0.05	0.15
25	0.05	0.15

ap = D × 1 ~ 2

øD	Min. *fz*	Max. *fz*
6	0.025	0.05
8	0.03	0.05
10	0.03	0.05
12	0.035	0.06
16	0.04	0.07
20	0.05	0.08
25	0.05	0.08



ae = D × 45 ~ 75 %

ap = D × 0.5 ~ 1

øD	Min. *fz*	Max. *fz*
6	0.025	0.07
8	0.03	0.09
10	0.03	0.1
12	0.035	0.11
16	0.05	0.13
20	0.05	0.17
25	0.05	0.17

ap = D × 1 ~ 2

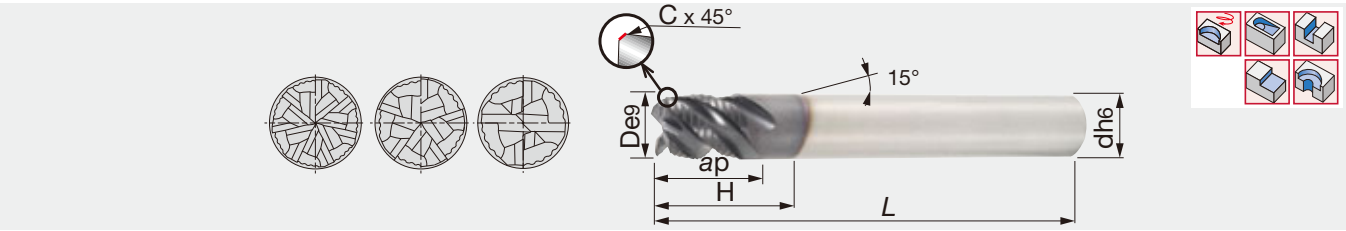
øD	Min. *fz*	Max. *fz*
6	0.025	0.06
8	0.03	0.08
10	0.03	0.09
12	0.035	0.1
16	0.05	0.11
20	0.05	0.11
25	0.05	0.11

• For the cutting conditions, please see D346.

SHREDMEISTER TUNGALOY

TECR**B*S...

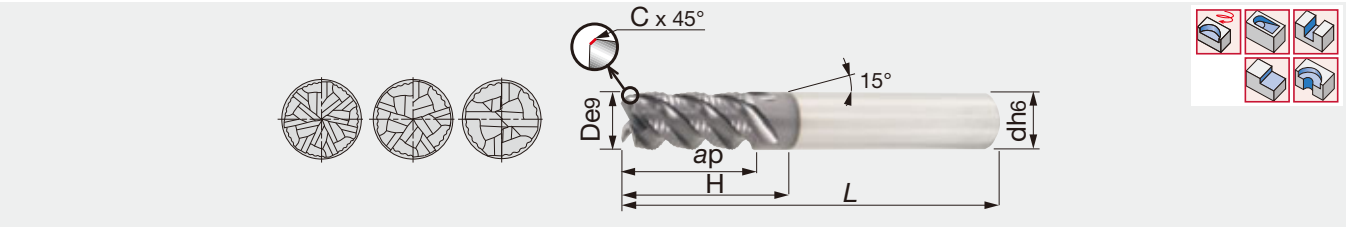
4 - 7 flutes rougher, 45° helix, short length (1xD)



Designation	AH725	D	*d*	C	*ap*	H	*L*	z		Shank
TECR050B4S-05W06-57	●	5	6	0.2	5	10	57	4	●	Weldon
TECR060B4S-06W06-57	●	6	6	0.25	6	-	57	4	●	Weldon
TECR080B4S-08W08-63	●	8	8	0.25	8	-	63	4	●	Weldon
TECR100B4S-10W10-72	●	10	10	0.3	10	-	72	4	●	Weldon
TECR120B4S-12W12-83	●	12	12	0.35	12	-	83	4	●	Weldon
TECR160B5S-16W16-92	●	16	16	0.4	16	-	92	5		Weldon
TECR200B7S-20W20-104	●	20	20	0.4	20	-	104	7		Weldon

TECR**B*M...

4 - 7 flutes rougher, 45° helix, medium length (2xD)



Designation	AH725	D	*d*	C	*ap*	H	*L*	z		Shank
TECR050B4M-10W06-57	●	5	6	0.2	10	15	57	4	●	Weldon
TECR060B4M-12W06-57	●	6	6	0.25	12	-	57	4	●	Weldon
TECR080B4M-16W08-63	●	8	8	0.25	16	-	63	4	●	Weldon
TECR100B4M-20W10-72	●	10	10	0.3	20	-	72	4	●	Weldon
TECR120B4M-24W12-83	●	12	12	0.35	24	-	83	4	●	Weldon
TECR160B5M-32W16-92	●	16	16	0.4	32	-	92	5		Weldon
TECR200B7M-40W20-104	●	20	20	0.4	40	-	104	7		Weldon

First choice in roughing applications.

Reference pages

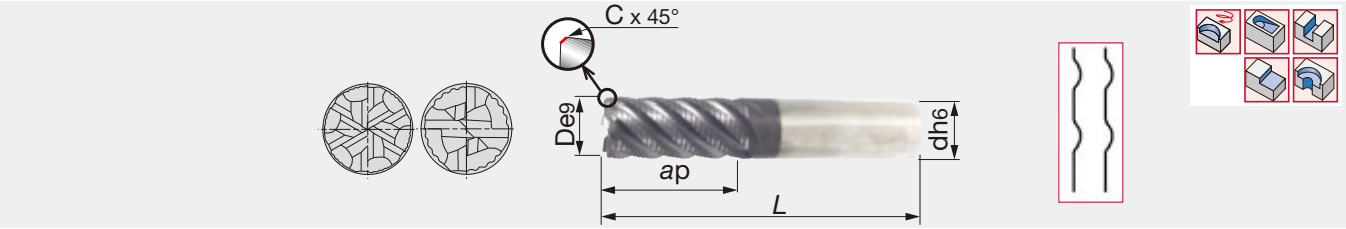
Standard cutting conditions → **D307**, **D309**

●: Line up

SHREDMEISTER

TECR**B*MF...

4, 6 flutes rougher, 45° helix, medium length,for machining hardened steel and titanium alloys



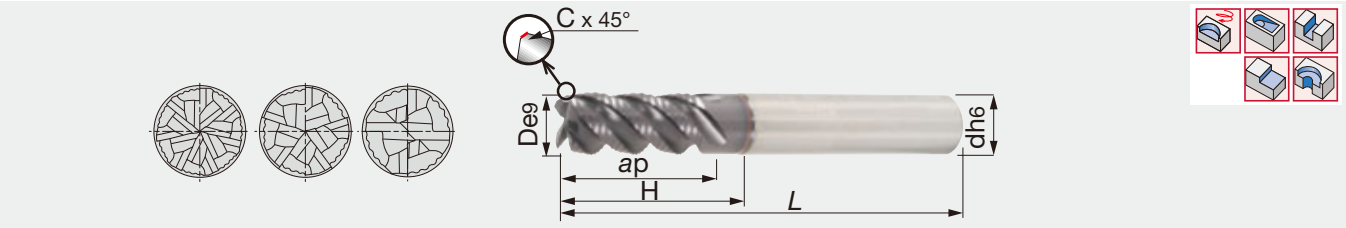
Designation	AH725	D	d	C	ap	L	z	Shank
TECR060B4MF-14W06-57	●	6	6	0.25	14	57	4	Weldon
TECR080B4MF-18W08-63	●	8	8	0.3	18	63	4	Weldon
TECR100B4MF-22W10-72	●	10	10	0.3	22	72	4	Weldon
TECR120B4MF-26W12-83	●	12	12	0.4	26	83	4	Weldon
TECR140B4MF-30W14-83	●	14	14	0.4	30	83	4	Weldon
TECR160B6MF-34W16-92	●	16	16	0.5	34	92	6	Weldon
TECR200B6MF-42W20-104	●	20	20	0.7	42	104	6	Weldon
TECR250B6MF-52W25-121	●	25	25	0.9	52	121	6	Weldon

The rougher's cutting edge profile has shallow serrations. This is a very durable design which leaves only a small amount of material for the finishing cut.

SHREDMEISTER

TECR**B*L...

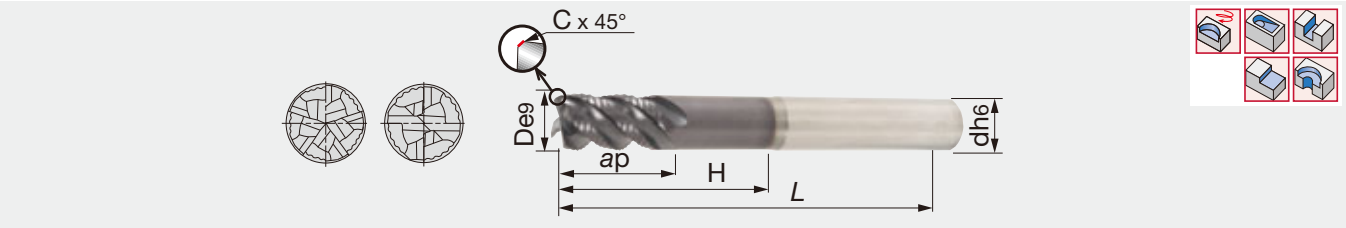
4 - 7 flutes rougher, 45° helix, long reach (3xD)



Designation	AH725	D	d	C	ap	H	L	z		Shank
TECR060B4L-12/18W06-57	●	6	6	0.25	12	18	57	4	●	Weldon
TECR080B4L-16/24W08-63	●	8	8	0.25	16	24	63	4	●	Weldon
TECR100B4L-20/30W10-72	●	10	10	0.3	20	30	72	4	●	Weldon
TECR120B4L-24/36W12-83	●	12	12	0.35	24	36	83	4	●	Weldon
TECR160B5L-32/48W16-100	●	16	16	0.4	32	48	100	5		Weldon
TECR200B7L-40/60W20-110	●	20	20	0.4	40	60	110	7		Weldon

TECR**B*X...

4 - 5 flutes rougher, 45° helix, extra long reach (4xD)



Designation	AH725	D	d	C	ap	H	L	z		Shank
TECR080B4X-12/32W08-68	●	8	8	0.25	12	32	68	4	●	Weldon
TECR100B4X-15/40W10-80	●	10	10	0.3	15	40	80	4	●	Weldon
TECR120B4X-18/48W12-100	●	12	12	0.35	18	48	100	4	●	Weldon
TECR160B5X-24/64W16-115	●	16	16	0.4	24	64	115	5		Weldon

First choice in roughing applications.

Reference pages

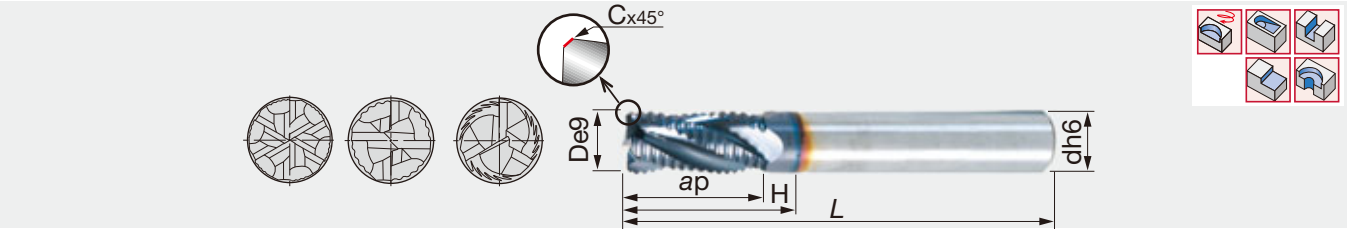
Standard cutting conditions → **D307**, **D309**

●: Line up

SHREDMEISTER TUNGALOY

TERF**A..., TERF**E...

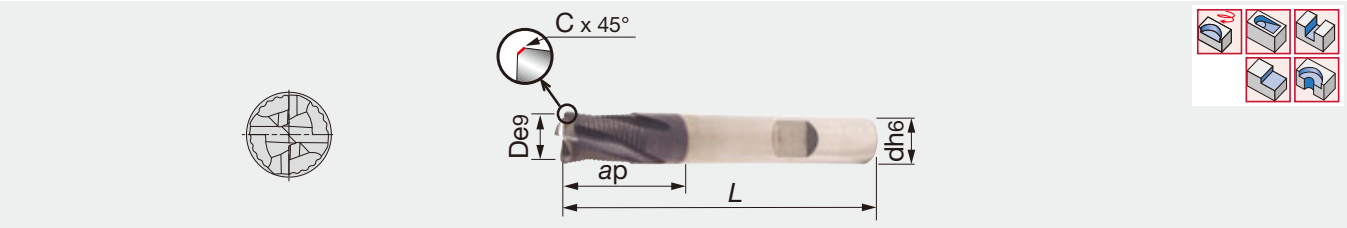
3 - 6 flutes rougher, 30° and 38° helix, medium length fine pitch for alloy steel, stainless steel



Designation	AH725	D	d	C	ap	H	L	Helix	z	Shank
TERF040E3-08C06-57	●	4	6	0.25	8	13	57	38°	3	Cylindrical
TERF050E3-10C06-57	●	5	6	0.3	10	17	57	38°	3	Cylindrical
TERF060E3-13C06-57	●	6	6	0.3	13	21	57	38°	3	Cylindrical
TERF070E3-20C08-63	●	7	8	0.3	20	26	63	38°	3	Cylindrical
TERF080E3-20C08-63	●	8	8	0.3	20	28	63	38°	3	Cylindrical
TERF090A4-22C10-72	●	9	10	0.3	22	30	72	30°	4	Cylindrical
TERF100A4-22C10-72	●	10	10	0.3	22	30	72	30°	4	Cylindrical
TERF110A4-25C12-83	●	11	12	0.3	25	32	83	30°	4	Cylindrical
TERF120A4-25C12-83	●	12	12	0.4	25	37	83	30°	4	Cylindrical
TERF140A4-25C14-83	●	14	14	0.5	25	37	83	30°	4	Cylindrical
TERF160A4-32C16-92	●	16	16	0.5	32	44	92	30°	4	Cylindrical
TERF180A4-32C18-92	●	18	18	0.5	32	44	92	30°	4	Cylindrical
TERF200A4-38C20-104	●	20	20	0.6	38	55	104	30°	4	Cylindrical
TERF250A6-45C25-121	●	25	25	0.6	45	64	121	30°	6	Cylindrical

TECR**T4M...

4 flutes rougher, 20° helix, medium length



Designation	AH725	D	d	C	ap	L	z	Shank
TECR060T4M-10W06-57	●	6	6	0.3	10	57	4	Weldon
TECR080T4M-16W08-63	●	8	8	0.4	16	63	4	Weldon
TECR100T4M-20W10-72	●	10	10	0.4	20	72	4	Weldon
TECR120T4M-24W12-83	●	12	12	0.4	24	83	4	Weldon
TECR160T4M-32W16-92	●	16	16	0.5	32	92	4	Weldon
TECR200T4M-40W20-104	●	20	20	0.5	40	104	4	Weldon

For maximum metal removal.

Reference pages

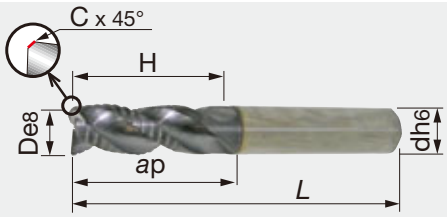
Standard cutting conditions → **D307**, **D309**

●: Line up

TECP**E*L...

3 flutes chip splitter rougher, 38° helix, medium length

M
Stainless



Designation	AH725	D	*d*	C	*ap*	H	*L*	Shank
TECP050E3L-12/17W06S57	●	5	6	0.3	12	17	57	Weldon
TECP060E3L-14/20W06S57	●	6	6	0.4	14	20	57	Weldon
TECP080E3L-18/26W08S63	●	8	8	0.4	18	26	63	Weldon
TECP100E3L-22/32W10S72	●	10	10	0.4	22	32	72	Weldon
TECP120E3L-26/38W12S83	●	12	12	0.4	26	38	83	Weldon
TECP140E3L-30/44W14S100	●	14	14	0.6	30	44	100	Weldon
TECP160E3L-34/50W16S100	●	16	16	0.5	34	50	100	Weldon
TECP200E3L-42/62W20S125	●	20	20	0.5	42	62	125	Weldon

4 flutes chip splitter rougher, 38° helix, medium length

Designation	AH725	D	*d*	C	*ap*	H	*L*	Shank
TECP050E4L-12/17W06S57	●	5	6	0.3	12	17	57	Weldon
TECP060E4L-14/20W06S57	●	6	6	0.4	14	20	57	Weldon
TECP080E4L-18/26W08S63	●	8	8	0.4	18	26	63	Weldon
TECP100E4L-22/32W10S72	●	10	10	0.4	22	32	72	Weldon
TECP120E4L-26/38W12S83	●	12	12	0.4	26	38	83	Weldon
TECP140E4L-30/44W14S100	●	14	14	0.6	30	44	100	Weldon
TECP160E4L-34/50W16S100	●	16	16	0.5	34	50	100	Weldon
TECP200E4L-42/62W20S125	●	20	20	0.5	42	62	125	Weldon

Most recommended for machining stainless steel.

Reference pages

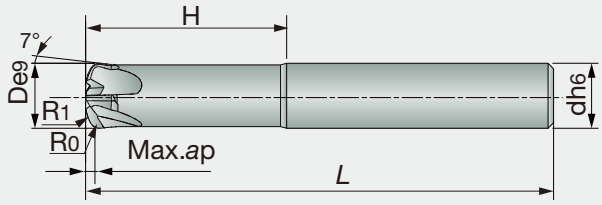
Standard cutting conditions → **D307**, **D309**

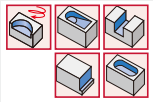
●: Line up

FEEDMEISTER TUNGALOY

TEFF**N4...

High feed, 4 flutes solid carbide endmills





Designation	AH750	D	*d*	R0(1)	R1	Max. *ap*	H	L	Max. fz mm/t
TEFF060N4-030/20C06R1M	●	6	6	1.2	5.3	0.3	20	57	0.3
TEFF080N4-035/26C08R13M	●	8	8	1.6	7	0.4	26	63	0.4
TEFF100N4-040/30C10R16M	●	10	10	2	8.8	0.5	30	72	0.5
TEFF120N4-045/34C12R2M	●	12	12	2.5	10.6	0.6	34	83	0.5
TEFF160N4-055/42C16R26M	●	16	16	3.3	14	0.8	42	92	0.6
TEFF200N4-060/46C20R32M	●	20	20	4	17.7	1	46	104	0.7

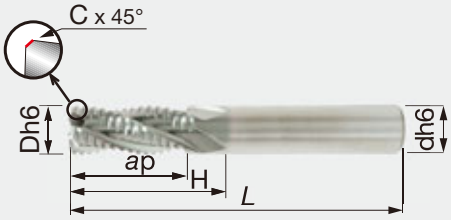
(1) R0 should be used for programming.

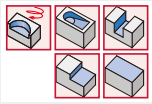
●: Line up

TERC**E3...

3 flutes rougher, 38° helix, medium length for maximum stock removal in aluminium.
Coarse pitch for aluminium and nonferrous materials.

N
Non-ferrous



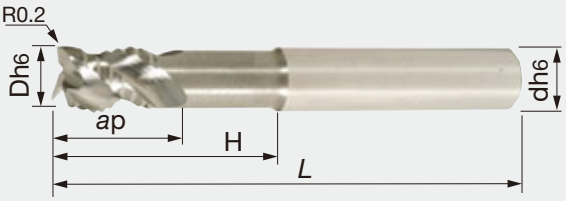


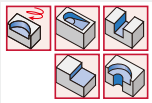
Designation	KS15F	D	d	C	ap	H	L	Shank
TERC060E3-13C06-57	●	6	6	0.5	13	21	57	Cylindrical
TERC080E3-20C08-63	●	8	8	0.5	20	28	63	Cylindrical
TERC100E3-22C10-72	●	10	10	0.6	22	30	72	Cylindrical
TERC120E3-25C12-83	●	12	12	0.6	25	37	83	Cylindrical
TERC140E3-25C14-83	●	14	14	0.6	25	37	83	Cylindrical
TERC160E3-32C16-92	●	16	16	0.6	32	44	92	Cylindrical
TERC200E3-38C20-104	●	20	20	0.7	38	55	104	Cylindrical

TECR**B3...

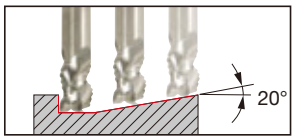
3 flutes rougher for aluminium, 45° helix, medium length

N
Non-ferrous





Designation	KS15F	D	d	ap	H	L	Shank
TECR060B3-09/21C06R02A57	●	6	6	9	21	57	Cylindrical
TECR080B3-12/27C08R02A63	●	8	8	12	27	63	Cylindrical
TECR100B3-12/31C10R02A72	●	10	10	12	31	72	Cylindrical
TECR120B3-12/37C12R02A83	●	12	12	12	37	83	Cylindrical
TECR160B3-14/43C16R02A92	●	16	16	14	43	92	Cylindrical
TECR200B3-17/53C20R02A104	●	20	20	17	53	104	Cylindrical



Rampdown angle

Reference pages

Standard cutting conditions → **D307**, **D309**

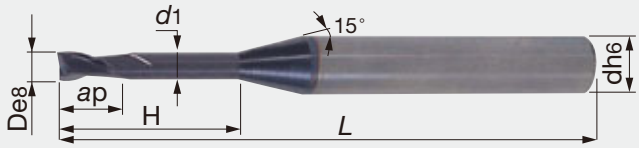
●: Line up

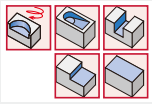
SOLIDMEISTER TUNGALOY

TEC**A2-**C*M...

2 flutes endmill for rib processing, 30° helix for materials up to 65 HRC

H
Hard Materials





Designation	AH750	D	d	d1	ap	H	L	Shank
TEC004A2-006/02C4M45	●	0.4	4	0.37	0.6	2	45	Cylindrical
TEC004A2-006/04C4M45	●	0.4	4	0.37	0.6	4	45	Cylindrical
TEC005A2-007/02C4M45	●	0.5	4	0.45	0.7	2	45	Cylindrical
TEC005A2-007/04C4M45	●	0.5	4	0.45	0.7	4	45	Cylindrical
TEC005A2-007/06C4M45	●	0.5	4	0.45	0.7	6	45	Cylindrical
TEC006A2-009/02C4M45	●	0.6	4	0.55	0.9	2	45	Cylindrical
TEC006A2-009/04C4M45	●	0.6	4	0.55	0.9	4	45	Cylindrical
TEC006A2-009/06C4M45	●	0.6	4	0.55	0.9	6	45	Cylindrical
TEC007A2-010/02C4M45	●	0.7	4	0.65	1	2	45	Cylindrical
TEC007A2-010/04C4M45	●	0.7	4	0.65	1	4	45	Cylindrical
TEC007A2-010/06C4M45	●	0.7	4	0.65	1	6	45	Cylindrical
TEC008A2-012/04C4M45	●	0.8	4	0.75	1.2	4	45	Cylindrical
TEC008A2-012/06C4M45	●	0.8	4	0.75	1.2	6	45	Cylindrical
TEC008A2-012/08C4M45	●	0.8	4	0.75	1.2	8	45	Cylindrical
TEC009A2-0135/06C4M45	●	0.9	4	0.85	1.35	6	45	Cylindrical
TEC009A2-0135/08C4M45	●	0.9	4	0.85	1.35	8	45	Cylindrical
TEC009A2-0135/10C4M45	●	0.9	4	0.85	1.35	10	45	Cylindrical
TEC010A2-015/04C4M45	●	1	4	0.97	1.5	4	45	Cylindrical
TEC010A2-015/06C4M45	●	1	4	0.97	1.5	6	45	Cylindrical
TEC010A2-015/08C4M45	●	1	4	0.95	1.5	8	45	Cylindrical
TEC010A2-015/10C4M45	●	1	4	0.95	1.5	10	45	Cylindrical
TEC010A2-015/12C4M45	●	1	4	0.93	1.5	12	45	Cylindrical
TEC010A2-015/16C4M50	●	1	4	0.93	1.5	16	50	Cylindrical
TEC012A2-018/06C4M45	●	1.2	4	1.17	1.8	6	45	Cylindrical
TEC012A2-018/08C4M45	●	1.2	4	1.15	1.8	8	45	Cylindrical
TEC012A2-018/10C4M45	●	1.2	4	1.15	1.8	10	45	Cylindrical
TEC012A2-018/12C4M45	●	1.2	4	1.13	1.8	12	45	Cylindrical
TEC012A2-018/16C4M50	●	1.2	4	1.13	1.8	16	50	Cylindrical
TEC014A2-021/06C4M45	●	1.4	4	1.35	2.1	6	45	Cylindrical
TEC014A2-021/08C4M45	●	1.4	4	1.35	2.1	8	45	Cylindrical
TEC014A2-021/10C4M45	●	1.4	4	1.35	2.1	10	45	Cylindrical
TEC014A2-021/12C4M45	●	1.4	4	1.33	2.1	12	45	Cylindrical
TEC014A2-021/16C4M50	●	1.4	4	1.31	2.1	16	50	Cylindrical
TEC015A2-023/06C4M45	●	1.5	4	1.47	2.3	6	45	Cylindrical
TEC015A2-023/08C4M45	●	1.5	4	1.45	2.3	8	45	Cylindrical
TEC015A2-023/10C4M45	●	1.5	4	1.45	2.3	10	45	Cylindrical
TEC015A2-023/12C4M45	●	1.5	4	1.43	2.3	12	45	Cylindrical
TEC015A2-023/16C4M50	●	1.5	4	1.41	2.3	16	50	Cylindrical

Reference pages

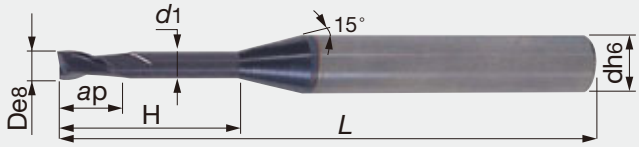
Standard cutting conditions → **D307**, **D309**

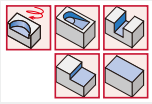
●: Line up

TEC**A2-**C*M...

2 flutes endmill for rib processing, 30° helix for materials up to 65 HRC

H
Hard Materials





Designation	AH750	D	d	d1	ap	H	L	Shank
TEC015A2-023/18C4M55	●	1.5	4	1.41	2.3	18	55	Cylindrical
TEC015A2-023/20C4M55	●	1.5	4	1.41	2.3	20	55	Cylindrical
TEC016A2-024/06C4M45	●	1.6	4	1.57	2.4	6	45	Cylindrical
TEC016A2-024/08C4M45	●	1.6	4	1.55	2.4	8	45	Cylindrical
TEC016A2-024/10C4M45	●	1.6	4	1.55	2.4	10	45	Cylindrical
TEC016A2-024/12C4M45	●	1.6	4	1.53	2.4	12	45	Cylindrical
TEC016A2-024/16C4M50	●	1.6	4	1.53	2.4	16	50	Cylindrical
TEC016A2-024/18C4M55	●	1.6	4	1.53	2.4	18	55	Cylindrical
TEC016A2-024/20C4M55	●	1.6	4	1.53	2.4	20	55	Cylindrical
TEC016A2-024/26C4M60	●	1.6	4	1.53	2.4	26	60	Cylindrical
TEC018A2-027/06C4M45	●	1.8	4	1.77	2.7	6	45	Cylindrical
TEC018A2-027/08C4M45	●	1.8	4	1.75	2.7	8	45	Cylindrical
TEC018A2-027/10C4M45	●	1.8	4	1.75	2.7	10	45	Cylindrical
TEC018A2-027/12C4M45	●	1.8	4	1.73	2.7	12	45	Cylindrical
TEC018A2-027/16C4M50	●	1.8	4	1.71	2.7	16	50	Cylindrical
TEC018A2-027/18C4M55	●	1.8	4	1.71	2.7	18	55	Cylindrical
TEC018A2-027/20C4M55	●	1.8	4	1.69	2.7	20	55	Cylindrical
TEC020A2-030/06C4M45	●	2	4	1.97	3	6	45	Cylindrical
TEC020A2-030/08C4M45	●	2	4	1.95	3	8	45	Cylindrical
TEC020A2-030/10C4M45	●	2	4	1.95	3	10	45	Cylindrical
TEC020A2-030/12C4M45	●	2	4	1.93	3	12	45	Cylindrical
TEC020A2-030/16C4M50	●	2	4	1.91	3	16	50	Cylindrical
TEC020A2-030/20C4M55	●	2	4	1.89	3	20	55	Cylindrical
TEC020A2-030/30C4M70	●	2	4	1.89	3	30	70	Cylindrical
TEC025A2-037/08C4M45	●	2.5	4	2.4	3.7	8	45	Cylindrical
TEC025A2-037/10C4M45	●	2.5	4	2.4	3.7	10	45	Cylindrical
TEC025A2-037/12C4M45	●	2.5	4	2.4	3.7	12	45	Cylindrical
TEC025A2-037/16C4M55	●	2.5	4	2.4	3.7	16	55	Cylindrical
TEC025A2-037/20C4M60	●	2.5	4	2.4	3.7	20	60	Cylindrical
TEC025A2-037/30C4M80	●	2.5	4	2.4	3.7	30	80	Cylindrical
TEC030A2-045/08C6M45	●	3	6	2.85	4.5	8	45	Cylindrical
TEC030A2-045/10C6M45	●	3	6	2.85	4.5	10	45	Cylindrical
TEC030A2-045/12C6M45	●	3	6	2.85	4.5	12	45	Cylindrical
TEC030A2-045/16C6M55	●	3	6	2.85	4.5	16	55	Cylindrical
TEC030A2-045/20C6M60	●	3	6	2.85	4.5	20	60	Cylindrical
TEC030A2-045/30C6M70	●	3	6	2.85	4.5	30	70	Cylindrical
TEC030A2-045/40C6M90	●	3	6	2.85	4.5	40	90	Cylindrical

Reference pages

Standard cutting conditions → **D307**, **D309**

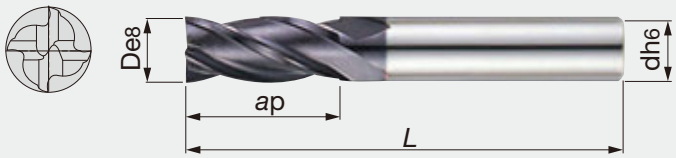
●: Line up

SOLIDMEISTER TUNGALOY

TEC**A4-**C...

4 flutes, 30° helix, medium length for materials up to 65 HRC

H Hard Materials

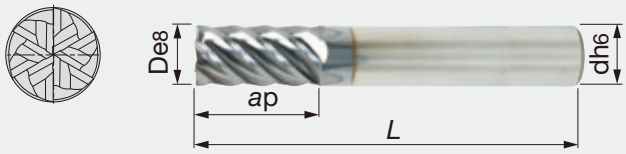


Designation	AH750	D	d	ap	L	Shank
TEC040A4-11C06-45	●	4	6	11	45	Cylindrical
TEC050A4-13C06-50	●	5	6	13	50	Cylindrical
TEC060A4-13C06-50	●	6	6	13	50	Cylindrical
TEC070A4-16C08-60	●	7	8	16	60	Cylindrical
TEC080A4-19C08-60	●	8	8	19	60	Cylindrical
TEC090A4-19C10-70	●	9	10	19	70	Cylindrical
TEC100A4-22C10-70	●	10	10	22	70	Cylindrical
TEC120A4-26C12-75	●	12	12	26	75	Cylindrical
TEC140A4-26C14-85	●	14	14	26	85	Cylindrical
TEC160A4-32C16-100	●	16	16	32	100	Cylindrical
TEC180A4-32C18-100	●	18	18	32	100	Cylindrical
TEC200A4-38C20-105	●	20	20	38	105	Cylindrical

TECH**B6...

6 flutes endmill, 45° helix, medium length for finishing hardened steels, for materials up to 65 HRC

H Hard Materials



Designation	AH750	D	d	ap	L	Shank
TECH060B6-16C06-57	●	6	6	16	57	Cylindrical
TECH080B6-20C08-63	●	8	8	20	63	Cylindrical
TECH100B6-22C10-72	●	10	10	22	72	Cylindrical
TECH120B6-25C12-83	●	12	12	25	83	Cylindrical
TECH160B6-32C16-92	●	16	16	32	92	Cylindrical
TECH200B6-38C20-104	●	20	20	38	104	Cylindrical

Reference pages

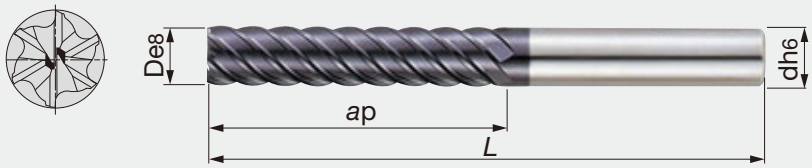
Standard cutting conditions → **D307**, **D309**

●: Line up

TEC**B6...

6 flutes, 45° helix, extra long length, for materials up to 65 HRC

H Hard Materials



Designation	AH750	D	*d*	*ap*	*L*	Shank
TEC060B6-26C06-70	●	6	6	26	70	Cylindrical
TEC080B6-36C08-90	●	8	8	36	90	Cylindrical
TEC100B6-46C10-100	●	10	10	46	100	Cylindrical
TEC120B6-56C12-110	●	12	12	56	110	Cylindrical
TEC160B6-66C16-130	●	16	16	66	130	Cylindrical
TEC200B6-76C20-140	●	20	20	76	140	Cylindrical
TEC250B6-92C25-180	●	25	25	92	180	Cylindrical

TEC**D6...

6 flutes endmill, 50° helix, medium length, for materials up to 65 HRC

H Hard Materials

Designation	AH750	D	*d*	*ap*	*L*	Shank
TEC060D6-13C06H57	●	6	6	13	57	Cylindrical
TEC080D6-20C08H63	●	8	8	20	63	Cylindrical
TEC100D6-22C10H72	●	10	10	22	72	Cylindrical
TEC120D6-25C12H83	●	12	12	25	83	Cylindrical
TEC140D6-30C14H83	●	14	14	30	83	Cylindrical
TEC160D6-32C16H92	●	16	16	32	92	Cylindrical
TEC200D6-38C20H104	●	20	20	38	104	Cylindrical

Reference pages

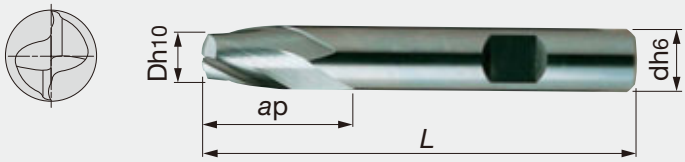
Standard cutting conditions → **D307**, **D309**

●: Line up

ECOMEISTER TUNGALOY

TEC**A2...

2 flutes, 30° helix, short cutting length

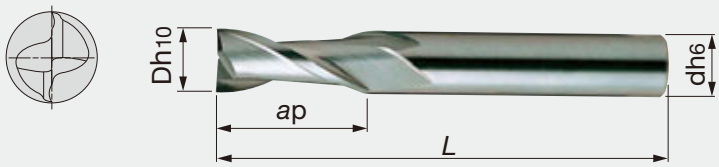


Designation	AH725	D	*d*	*ap*	*L*	Shank
TEC020A2-03W06-E50	●	2	6	3	50	Weldon
TEC030A2-04W06-E50	●	3	6	4	50	Weldon
TEC035A2-04W06-E50	●	3.5	6	4	50	Weldon
TEC040A2-05W06-E54	●	4	6	5	54	Weldon
TEC045A2-05W06-E54	●	4.5	6	5	54	Weldon
TEC050A2-06W06-E54	●	5	6	6	54	Weldon
TEC060A2-07W06-E54	●	6	6	7	54	Weldon
TEC070A2-08W08-E58	●	7	8	8	58	Weldon
TEC080A2-09W08-E58	●	8	8	9	58	Weldon
TEC090A2-10W10-E66	●	9	10	10	66	Weldon
TEC100A2-11W10-E66	●	10	10	11	66	Weldon
TEC120A2-12W12-E73	●	12	12	12	73	Weldon
TEC140A2-14W14-E75	●	14	14	14	75	Weldon
TEC160A2-16W16-E82	●	16	16	16	82	Weldon
TEC180A2-18W18-E84	●	18	18	18	84	Weldon
TEC200A2-20W20-E92	●	20	20	20	92	Weldon

●: Line up

TEC**A2...

2 flutes, medium length, 30° helix



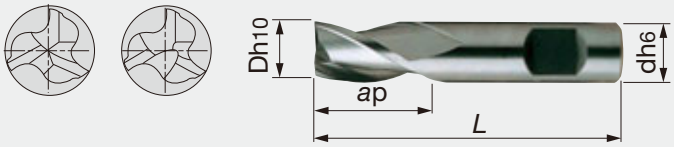
Designation	AH725	D	*d*	*ap*	*L*	Shank
TEC010A2-03C04-E50	●	1	4	3	50	Cylindrical
TEC015A2-045C04-E50	●	1.5	4	4.5	50	Cylindrical
TEC020A2-08C02-E32	●	2	2	8	32	Cylindrical
TEC025A2-08C025-E32	●	2.5	2.5	8	32	Cylindrical
TEC030A2-12C03-E38	●	3	3	12	38	Cylindrical
TEC035A2-12C035-E32	●	3.5	3.5	12	32	Cylindrical
TEC040A2-12C04-E50	●	4	4	12	50	Cylindrical
TEC045A2-14C045-E50	●	4.5	4.5	14	50	Cylindrical
TEC050A2-14C05-E50	●	5	5	14	50	Cylindrical
TEC055A2-16C055-E50	●	5.5	5.5	16	50	Cylindrical
TEC060A2-16C06-E50	●	6	6	16	50	Cylindrical
TEC070A2-20C07-E60	●	7	7	20	60	Cylindrical
TEC080A2-20C08-E63	●	8	8	20	63	Cylindrical
TEC090A2-20C09-E60	●	9	9	20	60	Cylindrical
TEC100A2-22C10-E72	●	10	10	22	72	Cylindrical
TEC120A2-22C12-E70	●	12	12	22	70	Cylindrical
TEC140A2-25C14-E75	●	14	14	25	75	Cylindrical
TEC160A2-25C16-E75	●	16	16	25	75	Cylindrical
TEC200A2-32C20-E100	●	20	20	32	100	Cylindrical

●: Line up

ECOMEISTER TUNGALOY

TEC**A3..., TEC**E3...

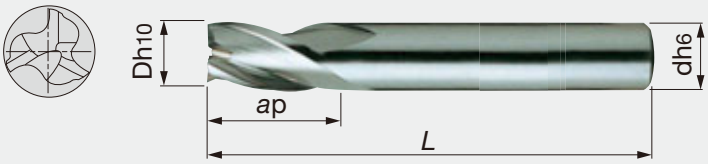
3 flutes, 30° and 38° helix, short length



Designation	AH725	D	*d*	*ap*	*L*	Helix	Shank
TEC020E3-04C06-E35	●	2	6	4	35	38	Cylindrical
TEC025E3-05C06-E36	●	2.5	6	5	36	38	Cylindrical
TEC030E3-05C06-E36	●	3	6	5	36	38	Cylindrical
TEC035A3-06W06-E37	●	3.5	6	6	37	30	Weldon
TEC040E3-07C06-E38	●	4	6	7	38	38	Cylindrical
TEC045A3-08W06-E38	●	4.5	6	8	38	30	Weldon
TEC050A3-08C06-E39	●	5	6	8	39	30	Cylindrical
TEC055A3-08W06-E39	●	5.5	6	8	39	30	Weldon
TEC060E3-08C06-E39	●	6	6	8	39	38	Cylindrical
TEC070A3-10W08-E42	●	7	8	10	42	30	Weldon
TEC080E3-11C08-E43	●	8	8	11	43	38	Cylindrical
TEC090A3-11W10-E48	●	9	10	11	48	30	Weldon
TEC100E3-13C10-E50	●	10	10	13	50	38	Cylindrical
TEC120A3-15C12-E55	●	12	12	15	55	30	Cylindrical

TEC**A3..., TEC**E3...

3 flutes, 30° and 38° helix, medium length

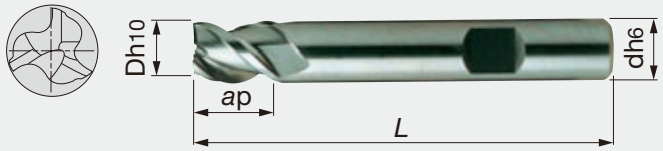


Designation	AH725	D	*d*	*ap*	*L*	Helix	Shank
TEC020E3-08C02-E32	●	2	2	8	32	38	Cylindrical
TEC030E3-12C03-E38	●	3	3	12	38	38	Cylindrical
TEC040E3-12C04-E50	●	4	4	12	50	38	Cylindrical
TEC050E3-14C05-E50	●	5	5	14	50	38	Cylindrical
TEC060E3-16C06-E50	●	6	6	16	50	38	Cylindrical
TEC070E3-20C07-E60	●	7	7	20	60	38	Cylindrical
TEC080E3-20C08-E63	●	8	8	20	63	38	Cylindrical
TEC090A3-20C09-E60	●	9	9	20	60	30	Cylindrical
TEC100E3-22C10-E72	●	10	10	22	72	38	Cylindrical
TEC120E3-22C12-E73	●	12	12	22	73	38	Cylindrical
TEC140A3-25C14-E75	●	14	14	25	75	30	Cylindrical
TEC160A3-25C16-E75	●	16	16	25	75	30	Cylindrical
TEC200E3-32C20-E104	●	20	20	32	104	38	Cylindrical

●: Line up

TEC**B3-**W...

3 flutes, 45° helix, short length



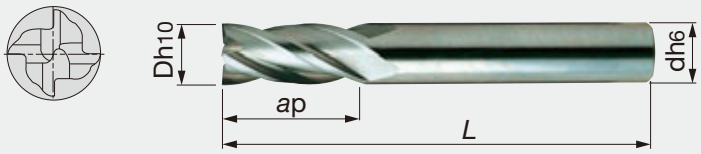
Designation	AH725	D	*d*	*ap*	*L*	Shank
TEC020B3-03W06-50	●	2	6	3	50	Weldon
TEC030B3-04W06-50	●	3	6	4	50	Weldon
TEC040B3-05W06-54	●	4	6	5	54	Weldon
TEC050B3-06W06-54	●	5	6	6	54	Weldon
TEC060B3-07W06-54	●	6	6	7	54	Weldon
TEC080B3-09W08-58	●	8	8	9	58	Weldon
TEC100B3-11W10-66	●	10	10	11	66	Weldon
TEC120B3-12W12-73	●	12	12	12	73	Weldon
TEC140B3-14W14-75	●	14	14	14	75	Weldon
TEC160B3-16W16-82	●	16	16	16	82	Weldon
TEC180B3-18W18-84	●	18	18	18	84	Weldon
TEC200B3-20W20-92	●	20	20	20	92	Weldon

●: Line up

ECOMEISTER TUNGALOY

TEC**A4-**C**-E...

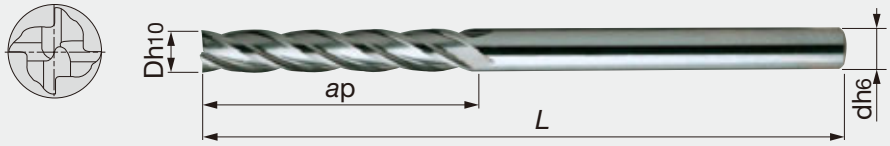
4 flutes, 30° helix, medium length



Designation	AH725	D	d	ap	L	Shank
TEC020A4-08C02-E32	●	2	2	8	32	Cylindrical
TEC025A4-08C025-E32	●	2.5	2.5	8	32	Cylindrical
TEC030A4-12C03-E32	●	3	3	12	32	Cylindrical
TEC035A4-12C035-E32	●	3.5	3.5	12	32	Cylindrical
TEC040A4-12C04-E50	●	4	4	12	50	Cylindrical
TEC045A4-14C045-E50	●	4.5	4.5	14	50	Cylindrical
TEC050A4-14C05-E50	●	5	5	14	50	Cylindrical
TEC055A4-16C055-E50	●	5.5	5.5	16	50	Cylindrical
TEC060A4-16C06-E50	●	6	6	16	50	Cylindrical
TEC070A4-20C07-E60	●	7	7	20	60	Cylindrical
TEC080A4-20C08-E60	●	8	8	20	60	Cylindrical
TEC090A4-20C09-E60	●	9	9	20	60	Cylindrical
TEC100A4-22C10-E72	●	10	10	22	72	Cylindrical
TEC120A4-22C12-E70	●	12	12	22	70	Cylindrical
TEC140A4-25C14-E75	●	14	14	25	75	Cylindrical
TEC160A4-25C16-E75	●	16	16	25	75	Cylindrical
TEC200A4-32C20-E100	●	20	20	32	100	Cylindrical

TEC**A4-**C**-E...

4 flutes, 30° helix, extra long



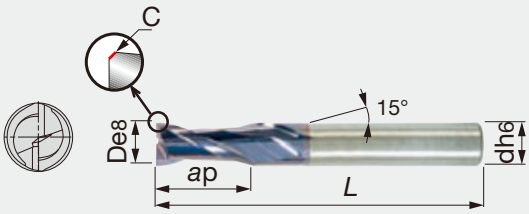
Designation	AH725	D	d	ap	L	Shank
TEC030A4-30C03-E75	●	3	3	30	75	Cylindrical
TEC040A4-30C04-E75	●	4	4	30	75	Cylindrical
TEC050A4-40C05-E100	●	5	5	40	100	Cylindrical
TEC060A4-50C06-E150	●	6	6	50	150	Cylindrical
TEC080A4-50C08-E150	●	8	8	50	150	Cylindrical
TEC100A4-60C10-E150	●	10	10	60	150	Cylindrical
TEC120A4-75C12-E150	●	12	12	75	150	Cylindrical
TEC140A4-65C14-E150	●	14	14	65	150	Cylindrical
TEC160A4-65C16-E150	●	16	16	65	150	Cylindrical
TEC200A4-65C20-E150	●	20	20	65	150	Cylindrical

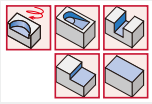
●: Line up

TECC**A2..., TECC**B2...

2 flutes slot drill, 30° and 45° helix, medium length

øD	C
D≤4	0.1x45°
4< D≤10	0.15x45°
10< D	0.25x45°



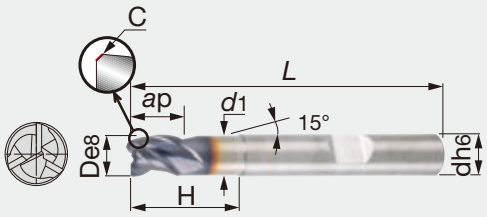


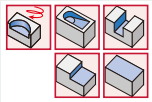
Designation	AH725	D	d	ap	L	Helix	Shank
TECC020B2-07C03-38	●	2	3	7	38	45°	Cylindrical
TECC030A2-10C03-38	●	3	3	10	38	30°	Cylindrical
TECC040A2-12C04-50	●	4	4	12	50	30°	Cylindrical
TECC050A2-14C05-50	●	5	5	14	50	30°	Cylindrical
TECC060A2-16C06-57	●	6	6	16	57	30°	Cylindrical
TECC080A2-20C08-63	●	8	8	20	63	30°	Cylindrical
TECC100A2-22C10-72	●	10	10	22	72	30°	Cylindrical
TECC120A2-25C12-83	●	12	12	25	83	30°	Cylindrical
TECC160A2-32C16-92	●	16	16	32	92	30°	Cylindrical
TECC200A2-38C20-104	●	20	20	38	104	30°	Cylindrical

TECS**E3..., TECCS**E3...

3 flutes slot drill, 38° helix, short length

øD	C
D≤4	0.1x45°
4< D≤10	0.15x45°
D>10	0.25x45°





Designation	AH725	D	d	d1	ap	H	L	Shank
TECS020E3-03W06-57	●	2	6	1.9	3	7	57	Weldon
TECS030E3-04W06-57	●	3	6	2.9	4	10	57	Weldon
TECS040E3-05W06-57	●	4	6	3.9	5	12	57	Weldon
TECS050E3-06W06-57	●	5	6	4.9	6	14	57	Weldon
TECCS060E3-07W06-57	●	6	6	5.9	7	16	57	Weldon
TECCS080E3-09W08-63	●	8	8	7.6	9	20	63	Weldon
TECCS100E3-11W10-72	●	10	10	9.5	11	22	72	Weldon
TECCS120E3-12W12-83	●	12	12	11.3	12	25	83	Weldon
TECCS160E3-16W16-92	●	16	16	15.2	16	32	92	Weldon
TECCS200E3-20W20-104	●	20	20	19	20	38	104	Weldon

Due to short and stable design, feed can be increased by 25%.

Reference pages

Standard cutting conditions → **D307**, **D309**

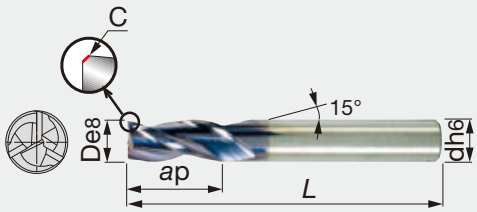
●: Line up

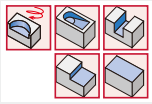
SOLIDMEISTER TUNGALOY

TECC**B3..., TECC**E3...

3 flutes slot drill, 38° and 45° helix, medium length

øD	C
D≤4	0.1x45°
4< D≤10	0.15x45°
10< D	0.25x45°





Designation	AH725	D	d	ap	L	Helix	Shank
TECC020B3-07C03-38	●	2	3	7	38	45°	Cylindrical
TECC030E3-10C03-38	●	3	3	10	38	38°	Cylindrical
TECC040E3-12C04-50	●	4	4	12	50	38°	Cylindrical
TECC050E3-14C05-50	●	5	5	14	50	38°	Cylindrical
TECC060E3-16C06-57	●	6	6	16	57	38°	Cylindrical
TECC080E3-20C08-63	●	8	8	20	63	38°	Cylindrical
TECC100E3-22C10-72	●	10	10	22	72	38°	Cylindrical
TECC120E3-25C12-83	●	12	12	25	83	38°	Cylindrical
TECC160E3-32C16-92	●	16	16	32	92	38°	Cylindrical
TECC200E3-38C20-104	●	20	20	38	104	38°	Cylindrical

Multi-purpose endmills.
Also suitable for deep slotting.

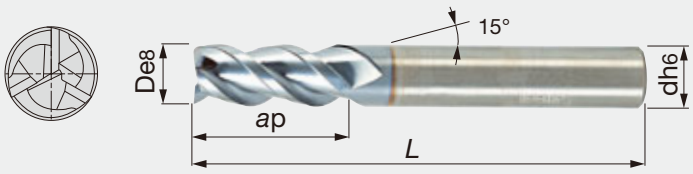
Reference pages

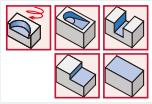
Standard cutting conditions → **D307**, **D309**

●: Line up

TEC**B3-**C...

3 flutes slot drill, 45° helix, medium length





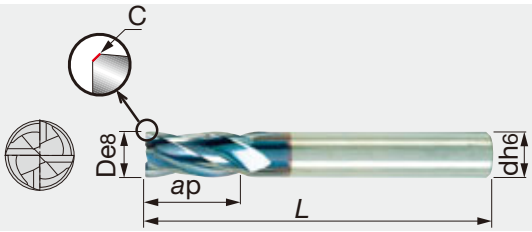
Designation	AH725	D	d	ap	L	Shank
TEC020B3-07C06-57	●	2	6	7	57	Cylindrical
TEC030B3-10C06-57	●	3	6	10	57	Cylindrical
TEC040B3-12C06-57	●	4	6	12	57	Cylindrical
TEC050B3-14C06-57	●	5	6	14	57	Cylindrical
TEC060B3-16C06-57	●	6	6	16	57	Cylindrical
TEC070B3-16C07-60	●	7	7	16	60	Cylindrical
TEC080B3-20C08-63	●	8	8	20	63	Cylindrical
TEC090B3-20C09-67	●	9	9	20	67	Cylindrical
TEC100B3-22C10-72	●	10	10	22	72	Cylindrical
TEC120B3-25C12-83	●	12	12	25	83	Cylindrical
TEC140B3-25C14-75	●	14	14	25	75	Cylindrical
TEC160B3-32C16-92	●	16	16	32	92	Cylindrical
TEC180B3-32C18-92	●	18	18	32	92	Cylindrical
TEC200B3-38C20-104	●	20	20	38	104	Cylindrical

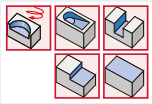
Excellent for deep slotting and shoulder milling.

TECC**A4..., TECC**B4...

4 flutes endmill, 30° and 45° helix, medium length

øD	C
D≤4	0.1x45°
4< D≤10	0.15x45°
10< D	0.25x45°





Designation	AH725	D	d	ap	L	Helix	Shank
TECC020B4-07C03-38	●	2	3	7	38	45	Cylindrical
TECC030A4-10C03-38	●	3	3	10	38	30	Cylindrical
TECC040A4-12C04-50	●	4	4	12	50	30	Cylindrical
TECC050A4-14C05-50	●	5	5	14	50	30	Cylindrical
TECC060A4-16C06-57	●	6	6	16	57	30	Cylindrical
TECC080A4-20C08-63	●	8	8	20	63	30	Cylindrical
TECC100A4-22C10-72	●	10	10	22	72	30	Cylindrical
TECC120A4-25C12-83	●	12	12	25	83	30	Cylindrical
TECC160A4-32C16-92	●	16	16	32	92	30	Cylindrical
TECC200A4-38C20-104	●	20	20	38	104	30	Cylindrical

Reference pages

Standard cutting conditions → **D307**, **D309**

●: Line up

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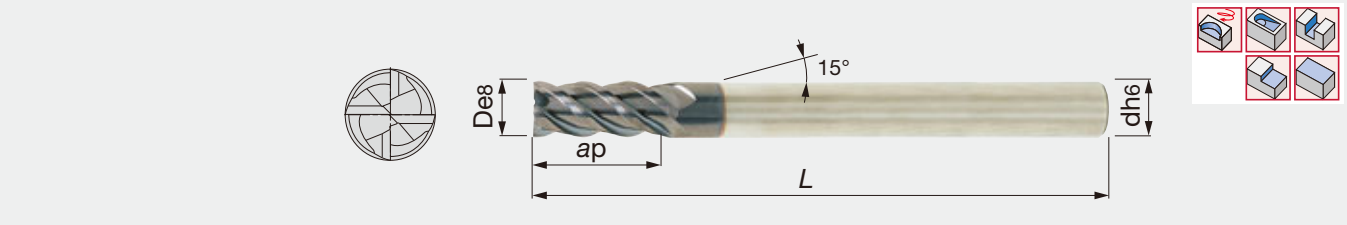
TEC**B4...

4 flutes endmill, 45° helix, medium length



Designation	AH725	D	*d*	*ap*	*L*	Shank
TEC020B4-07C06-57	●	2	6	7	57	Cylindrical
TEC030B4-10C06-57	●	3	6	10	57	Cylindrical
TEC040B4-12C06-57	●	4	6	12	57	Cylindrical
TEC050B4-14C06-57	●	5	6	14	57	Cylindrical
TEC060B4-16C06-57	●	6	6	16	57	Cylindrical
TEC080B4-20C08-63	●	8	8	20	63	Cylindrical
TEC100B4-22C10-72	●	10	10	22	72	Cylindrical
TEC120B4-25C12-83	●	12	12	25	83	Cylindrical
TEC140B4-25C14-83	●	14	14	25	83	Cylindrical
TEC160B4-32C16-92	●	16	16	32	92	Cylindrical
TEC180B4-32C18-92	●	18	18	32	92	Cylindrical
TEC200B4-38C20-104	●	20	20	38	104	Cylindrical

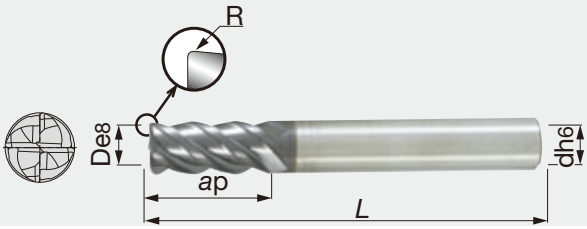
Reference pages

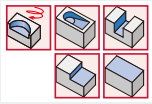
Standard cutting conditions → **D307**, **D309**

●: Line up

TEC**B4-**R...

4 flutes endmill with radius corner, 45° helix, medium length





Designation	AH725	D	*d*	R	*ap*	*L*	Shank
TEC060B4-16C06R05-57	●	6	6	0.5	16	57	Cylindrical
TEC060B4-16C06R1-57	●	6	6	1	16	57	Cylindrical
TEC080B4-20C08R05-63	●	8	8	0.5	20	63	Cylindrical
TEC080B4-20C08R1-63	●	8	8	1	20	63	Cylindrical
TEC080B4-20C08R15-63	●	8	8	1.5	20	63	Cylindrical
TEC080B4-20C08R2-63	●	8	8	2	20	63	Cylindrical
TEC100B4-22C10R05-72	●	10	10	0.5	22	72	Cylindrical
TEC100B4-22C10R1-72	●	10	10	1	22	72	Cylindrical
TEC100B4-22C10R15-72	●	10	10	1.5	22	72	Cylindrical
TEC100B4-22C10R2-72	●	10	10	2	22	72	Cylindrical
TEC100B4-22C10R3-72	●	10	10	3	22	72	Cylindrical
TEC120B4-25C12R05-83	●	12	12	0.5	25	83	Cylindrical
TEC120B4-25C12R1-83	●	12	12	1	25	83	Cylindrical
TEC120B4-25C12R15-83	●	12	12	1.5	25	83	Cylindrical
TEC120B4-25C12R2-83	●	12	12	2	25	83	Cylindrical
TEC120B4-25C12R3-83	●	12	12	3	25	83	Cylindrical
TEC160B4-32C16R05-92	●	16	16	0.5	32	92	Cylindrical
TEC160B4-32C16R1-92	●	16	16	1	32	92	Cylindrical
TEC160B4-32C16R2-92	●	16	16	2	32	92	Cylindrical
TEC160B4-32C16R3-92	●	16	16	3	32	92	Cylindrical
TEC200B4-38C20R05-104	●	20	20	0.5	38	104	Cylindrical
TEC200B4-38C20R1-104	●	20	20	1	38	104	Cylindrical
TEC200B4-38C20R2-104	●	20	20	2	38	104	Cylindrical
TEC200B4-38C20R3-104	●	20	20	3	38	104	Cylindrical
TEC200B4-38C20R4-104	●	20	20	4	38	104	Cylindrical

Reference pages

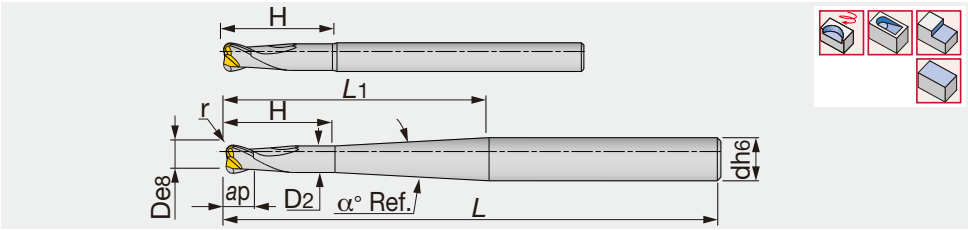
Standard cutting conditions → **D307**, **D309**

●: Line up

SOLIDMEISTER TUNGALOY

TETR**A2-**R...

2 flutes toroidal endmills

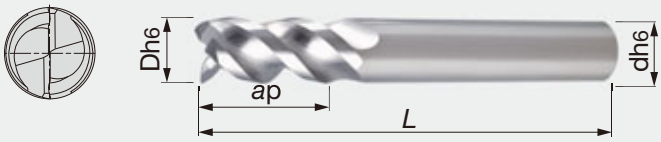


Designation	AH725	D	d	D2	r	ap	H	L1	α°	L	Shank
TETR020A2-2/08C06R05M80	●	2	6	1.9	0.5	2	8	40	3.6	80	Cylindrical
TETR030A2-2/12C06R05M80	●	3	6	2.8	0.5	2	12	40	3.3	80	Cylindrical
TETR040A2-3/16C06R1M80	●	4	6	3.7	1	3	16	40	2.8	80	Cylindrical
TETR060A2-4/25C06R2M80	●	6	6	5.6	2	4	25	-	0	80	Cylindrical
TETR060A2-4/25C08R2M100	●	6	8	5.6	2	4	25	66	2.0	100	Cylindrical
TETR080A2-4/32C08R2M100	●	7	8	7.6	2	4	32	-	0	100	Cylindrical
TETR080A2-4/32C10R2M120	●	7	10	7.6	2	4	32	66	2.0	120	Cylindrical
TETR100A2-6/40C10R3M120	●	10	10	9.6	3	6	40	-	0	120	Cylindrical
TETR100A2-6/40C12R3M158	●	10	12	9.6	3	6	40	110	1.0	158	Cylindrical

TECA**B2...

2 flutes aluminium slot drill, 45° helix, medium length

N
Non-ferrous



Designation	KS15F	D	d	ap	L	Shank
TECA040B2-12C06-57	●	4	6	12	57	Cylindrical
TECA050B2-14C06-57	●	5	6	14	57	Cylindrical
TECA060B2-16C06-57	●	6	6	16	57	Cylindrical
TECA080B2-20C08-63	●	8	8	20	63	Cylindrical
TECA100B2-22C10-72	●	10	10	22	72	Cylindrical
TECA120B2-25C12-83	●	12	12	25	83	Cylindrical
TECA160B2-32C16-92	●	16	16	32	92	Cylindrical
TECA200B2-38C20-104	●	20	20	38	104	Cylindrical

Special design for aluminium

Reference pages

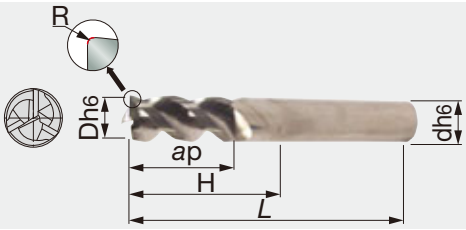
Standard cutting conditions → **D307**, **D309**

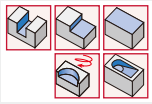
●: Line up

TECA**H3-**CF-R...

Solid carbide endmills for aluminium, center cutting, 3 flutes, 39 - 41° variable helix for chatter dampening

N
Non-ferrous





Designation	KS15F	D	d	R	ap	H	L	Shank
TECA030H3-07/12C06CF-R01	●	3	6	0.1	7	12	57	Cylindrical
TECA040H3-10/16C06CF-R02	●	4	6	0.2	10	16	57	Cylindrical
TECA050H3-12/20C06CF-R02	●	5	6	0.2	12	20	57	Cylindrical
TECA060H3-09/18C06CF-R02	●	6	6	0.2	9	18	57	Cylindrical
TECA060H3-09/18C06CF-R04	●	6	6	0.4	9	18	57	Cylindrical
TECA060H3-09/18C06CF-R08	●	6	6	0.8	9	18	57	Cylindrical
TECA080H3-12/24C08CF-R02	●	8	8	0.2	12	24	63	Cylindrical
TECA080H3-12/24C08CF-R04	●	8	8	0.4	12	24	63	Cylindrical
TECA080H3-12/24C08CF-R08	●	8	8	0.8	12	24	63	Cylindrical
TECA100H3-15/30C10CF-R02	●	10	10	0.2	15	30	72	Cylindrical
TECA100H3-15/30C10CF-R04	●	10	10	0.4	15	30	72	Cylindrical
TECA100H3-15/30C10CF-R08	●	10	10	0.8	15	30	72	Cylindrical
TECA120H3-18/36C12CF-R02	●	12	12	0.2	18	36	83	Cylindrical
TECA120H3-18/36C12CF-R04	●	12	12	0.4	18	36	83	Cylindrical
TECA120H3-18/36C12CF-R08	●	12	12	0.8	18	36	83	Cylindrical
TECA120H3-18/36C12CF-R16	●	12	12	1.6	18	36	83	Cylindrical
TECA160H3-24/48C16CF-R02	●	16	16	0.2	24	48	92	Cylindrical
TECA160H3-24/48C16CF-R04	●	16	16	0.4	24	48	92	Cylindrical
TECA160H3-24/48C16CF-R08	●	16	16	0.8	24	48	92	Cylindrical
TECA160H3-24/48C16CF-R16	●	16	16	1.6	24	48	92	Cylindrical
TECA160H3-24/48C16CF-R20	●	16	16	2	24	48	92	Cylindrical
TECA200H3-30/60C20CF-R04	●	20	20	0.4	30	60	110	Cylindrical
TECA200H3-30/60C20CF-R08	●	20	20	0.8	30	60	110	Cylindrical
TECA200H3-30/60C20CF-R16	●	20	20	1.6	30	60	110	Cylindrical
TECA200H3-30/60C20CF-R20	●	20	20	2	30	60	110	Cylindrical

●: Line up

SHREDMEISTER TUNGALOY

TEBRF**T*-...

3, 4 flutes roughing ball nose, 20° helix long length for materials up to 55 HRC

H
Hard Materials

Designation	AH750	D	*d*	R	*ap*	*L*	z	Shank
TEBRF060T3-16C06M57	●	6	6	3	16	57	3	Cylindrical
TEBRF080T3-16C08M63	●	8	8	4	16	63	3	Cylindrical
TEBRF100T4-22C10M72	●	10	10	5	22	72	4	Cylindrical
TEBRF120T4-26C12M83	●	12	12	6	26	83	4	Cylindrical
TEBRF140T4-26C14M83	●	14	14	7	26	83	4	Cylindrical
TEBRF160T4-32C16M92	●	16	16	8	32	92	4	Cylindrical
TEBRF180T4-32C18M92	●	18	18	9	32	92	4	Cylindrical
TEBRF200T4-38C20M104	●	20	20	10	38	104	4	Cylindrical

Reference pages

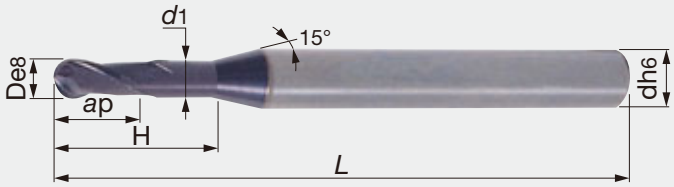
Standard cutting conditions → **D307**, **D309**

●: Line up

TEB**A2-**C**M...

2 flutes ball nose for rib processing, 30° helix for materials up to 65 HRC

H
Hard Materials



Designation	AH750	D	d	d1	ap	H	L	Shank
TEB004A2-006/02C4M45	●	0.4	4	0.36	0.6	2	45	Cylindrical
TEB004A2-006/03C4M45	●	0.4	4	0.36	0.6	3	45	Cylindrical
TEB005A2-007/02C4M45	●	0.5	4	0.45	0.7	2	45	Cylindrical
TEB005A2-007/04C4M45	●	0.5	4	0.45	0.7	4	45	Cylindrical
TEB005A2-007/06C4M45	●	0.5	4	0.45	0.7	6	45	Cylindrical
TEB006A2-009/02C4M45	●	0.6	4	0.55	0.9	2	45	Cylindrical
TEB006A2-009/04C4M45	●	0.6	4	0.55	0.9	4	45	Cylindrical
TEB006A2-009/06C4M45	●	0.6	4	0.55	0.9	6	45	Cylindrical
TEB008A2-012/04C4M45	●	0.8	4	0.75	1.2	4	45	Cylindrical
TEB008A2-012/06C4M45	●	0.8	4	0.75	1.2	6	45	Cylindrical
TEB008A2-012/08C4M45	●	0.8	4	0.75	1.2	8	45	Cylindrical
TEB010A2-015/04C4M45	●	1	4	0.97	1.5	4	45	Cylindrical
TEB010A2-015/06C4M45	●	1	4	0.97	1.5	6	45	Cylindrical
TEB010A2-015/08C4M45	●	1	4	0.95	1.5	8	45	Cylindrical
TEB010A2-015/10C4M45	●	1	4	0.95	1.5	10	45	Cylindrical
TEB010A2-015/12C4M45	●	1	4	0.93	1.5	12	45	Cylindrical
TEB010A2-015/16C4M50	●	1	4	0.93	1.5	16	50	Cylindrical
TEB012A2-018/08C4M45	●	1.2	4	1.17	1.8	8	45	Cylindrical
TEB012A2-018/12C4M45	●	1.2	4	1.13	1.8	12	45	Cylindrical
TEB014A2-021/08C4M45	●	1.4	4	1.35	2.1	8	45	Cylindrical
TEB014A2-021/12C4M45	●	1.4	4	1.33	2.1	12	45	Cylindrical
TEB014A2-021/16C4M50	●	1.4	4	1.31	2.1	16	50	Cylindrical
TEB015A2-023/06C4M45	●	1.5	4	1.47	2.3	6	45	Cylindrical
TEB015A2-023/08C4M45	●	1.5	4	1.45	2.3	8	45	Cylindrical
TEB015A2-023/10C4M45	●	1.5	4	1.45	2.3	10	45	Cylindrical
TEB015A2-023/12C4M45	●	1.5	4	1.43	2.3	12	45	Cylindrical
TEB015A2-023/16C4M50	●	1.5	4	1.41	2.3	16	50	Cylindrical
TEB015A2-023/20C4M55	●	1.5	4	1.39	2.3	20	55	Cylindrical
TEB016A2-024/08C4M45	●	1.6	4	1.55	2.4	8	45	Cylindrical
TEB016A2-024/12C4M45	●	1.6	4	1.53	2.4	12	45	Cylindrical
TEB016A2-024/16C4M50	●	1.6	4	1.51	2.4	16	50	Cylindrical
TEB016A2-024/20C4M55	●	1.6	4	1.49	2.4	20	55	Cylindrical

Reference pages

Standard cutting conditions → **D307**, **D309**

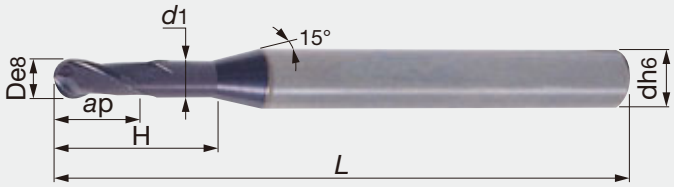
●: Line up

SOLIDMEISTER TUNGALOY

TEB**A2-**C**M...

2 flutes ball nose for rib processing, 30° helix for materials up to 65 HRC

H
Hard Materials



Designation	AH750	D	d	d1	ap	H	L	Shank
TEB018A2-027/08C4M45	●	1.8	4	1.75	2.7	8	45	Cylindrical
TEB018A2-027/12C4M45	●	1.8	4	1.73	2.7	12	45	Cylindrical
TEB018A2-027/16C4M50	●	1.8	4	1.71	2.7	16	50	Cylindrical
TEB018A2-027/20C4M55	●	1.8	4	1.69	2.7	20	55	Cylindrical
TEB020A2-030/06C4M45	●	2	4	1.97	3	6	45	Cylindrical
TEB020A2-030/10C4M45	●	2	4	1.93	3	10	45	Cylindrical
TEB020A2-030/12C4M50	●	2	4	1.93	3	12	50	Cylindrical
TEB020A2-030/16C4M50	●	2	4	1.91	3	16	50	Cylindrical
TEB020A2-030/20C4M55	●	2	4	1.89	3	20	55	Cylindrical
TEB020A2-030/30C4M70	●	2	4	1.89	3	30	70	Cylindrical
TEB030A2-045/08C6M50	●	3	6	2.85	4.5	8	50	Cylindrical
TEB030A2-045/10C6M50	●	3	6	2.85	4.5	10	50	Cylindrical
TEB030A2-045/12C6M50	●	3	6	2.85	4.5	12	50	Cylindrical
TEB030A2-045/16C6M55	●	3	6	2.85	4.5	16	55	Cylindrical
TEB030A2-045/20C6M60	●	3	6	2.85	4.5	20	60	Cylindrical
TEB030A2-045/30C6M70	●	3	6	2.85	4.5	30	70	Cylindrical

Reference pages

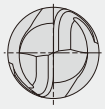
Standard cutting conditions → **D307**, **D309**

●: Line up

TEB**A2-**C**H...

2 flutes ball nose, 30° helix, stub cut length for materials up to 55 - 70 HRC

H
Hard Materials



Designation	AH750	D	d	d1	R±0.01	ap	H	L	Shank
TEB010A2-01/02C04H50	●	1	4	0.95	0.5	1	2.2	50	Cylindrical
TEB020A2-02/04C06H50	●	2	6	1.9	1	2	4	50	Cylindrical
TEB030A2-03/06C06H60	●	3	6	2.9	1.5	3	6	60	Cylindrical
TEB040A2-04/08C06H70	●	4	6	3.9	2	4	8	70	Cylindrical
TEB050A2-05/10C06H80	●	5	6	4.9	2.5	5	10	80	Cylindrical
TEB060A2-06/12C06H90	●	6	6	5.9	3	6	12	90	Cylindrical
TEB080A2-08/16C08H100	●	8	8	7.9	4	8	16	100	Cylindrical
TEB100A2-10/20C10H100	●	10	10	9.9	5	10	20	100	Cylindrical
TEB120A2-12/24C12H110	●	12	12	11.9	6	12	24	110	Cylindrical
TEB160A2-16/32C16H140	●	16	16	15.8	8	16	32	140	Cylindrical
TEB200A2-20/40C20H160	●	20	20	19.8	10	20	40	160	Cylindrical

Reference pages

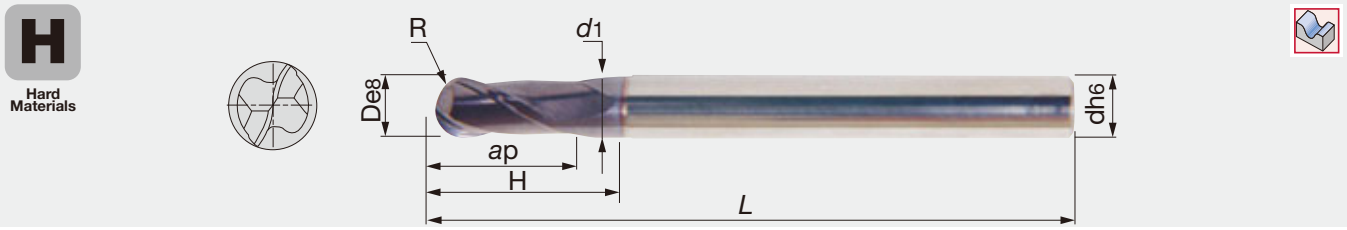
Standard cutting conditions → **D307**, **D309**

●: Line up

SOLIDMEISTER TUNGALOY

TEB**A2-**C**M...

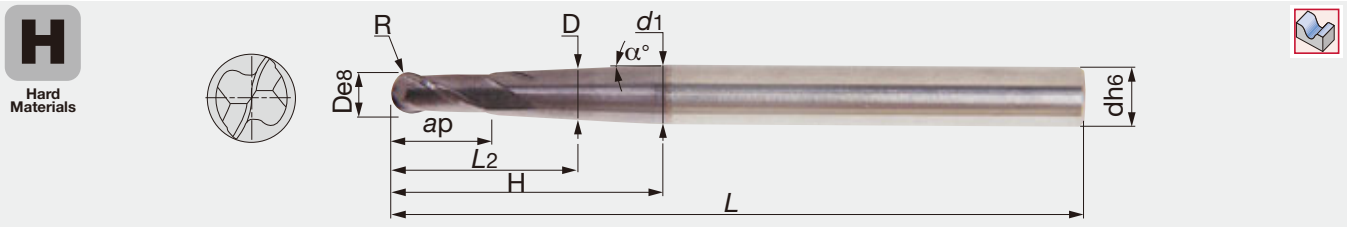
2 flutes long ball nose with neck, 30° helix for materials up to 65 HRC



Designation	AH750	D	d	d1	R	ap	H	L	Shank
TEB030A2-08C06M70	●	3	6	-	1.5	8	-	70	Cylindrical
TEB040A2-08C06M70	●	4	6	-	2	8	-	70	Cylindrical
TEB050A2-12C06M80	●	5	6	-	2.5	12	-	80	Cylindrical
TEB060A2-12/22C06M80	●	6	6	5.8	3	12	22	80	Cylindrical
TEB080A2-14/27C08M90	●	8	8	7.8	4	14	27	90	Cylindrical
TEB100A2-18/31C10M100	●	10	10	9.8	5	18	31	100	Cylindrical
TEB120A2-22/35C12M110	●	12	12	11.8	6	22	35	110	Cylindrical
TEB160A2-30/50C16M140	●	16	16	15.8	8	30	50	140	Cylindrical
TEB200A2-38/58C20M160	●	20	20	19.8	10	38	58	160	Cylindrical

TEB**A2-**C**M...

2 flutes ball nose, tapered neck for materials up to 65 HRC



Designation	AH750	D	d	d1	R±0.01	ap	L2	H	α°	L	Shank
TEB010A2-02/04/3.0C06M80	●	1	6	5	0.5	2	4	42	3	80	Cylindrical
TEB020A2-04/06/3.0C06M80	●	2	6	5.7	1	4	6	41	3	80	Cylindrical
TEB030A2-06/08/3.0C06M70	●	3	6	5.6	1.5	6	8	32	3	70	Cylindrical
TEB040A2-08/10/1.5C06M90	●	4	6	6	2	8	10	49	1.5	90	Cylindrical
TEB050A2-10/12/1.5C08M110	●	5	8	7.6	2.5	10	12	61	1.5	110	Cylindrical
TEB060A2-12/15/1.5C08M110	●	6	8	8	3	12	15	53	1.5	110	Cylindrical
TEB080A2-14/17/1.5C10M120	●	8	10	10	4	14	17	55	1.5	120	Cylindrical
TEB100A2-18/21/1.5C12M130	●	10	12	12	5	18	21	59	1.5	130	Cylindrical
TEB120A2-22/25/1.5C16M160	●	12	16	15	6	22	25	83	1.5	160	Cylindrical

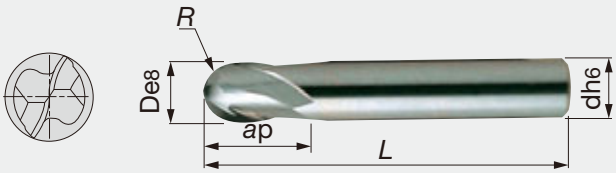
Reference pages

Standard cutting conditions → **D307**, **D309**

●: Line up

TEB**A2-**C**-E...

2 flutes ball nose, 30° helix, short length



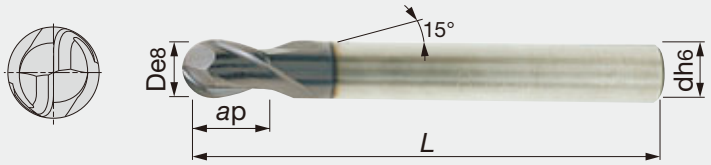
Designation	AH725	D	*d*	R	*ap*	*L*	Shank
TEB020A2-06C03-E38	●	2	3	1	6	38	Cylindrical
TEB020A2-04C06-E48	●	2	6	1	4	48	Cylindrical
TEB025A2-04C06-E48	●	2.5	6	1.3	4	48	Cylindrical
TEB030A2-04C06-E48	●	3	6	1.5	4	48	Cylindrical
TEB040A2-06C06-E50	●	4	6	2	6	50	Cylindrical
TEB050A2-07C06-E51	●	5	6	2.5	7	51	Cylindrical
TEB060A2-07C06-E51	●	6	6	3	7	51	Cylindrical
TEB080A2-09C08-E59	●	8	8	4	9	59	Cylindrical
TEB100A2-10C10-E60	●	10	10	5	10	60	Cylindrical
TEB120A2-14C12-E71	●	12	12	6	14	71	Cylindrical
TEB140A2-14C14-E71	●	14	14	7	14	71	Cylindrical
TEB160A2-16C16-E76	●	16	16	8	16	76	Cylindrical
TEB180A2-18C18-E76	●	18	18	9	18	76	Cylindrical
TEB200A2-20C20-E82	●	20	20	10	20	82	Cylindrical

●: Line up

SOLIDMEISTER TUNGALOY

TEB**A2-**C**-...

2 flutes ball nose, 30° helix, short length



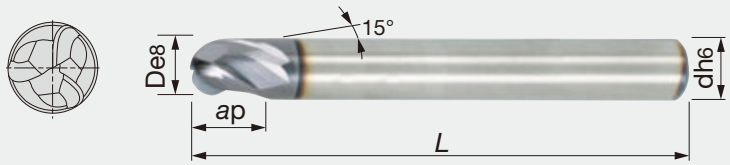
Designation	AH725	D	d	ap	L	Shank
TEB030A2-05C06-57	●	3	6	5	57	Cylindrical
TEB040A2-07C06-57	●	4	6	7	57	Cylindrical
TEB050A2-08C06-57	●	5	6	8	57	Cylindrical
TEB060A2-08C06-57	●	6	6	8	57	Cylindrical
TEB080A2-11C08-63	●	8	8	11	63	Cylindrical
TEB100A2-13C10-72	●	10	10	13	72	Cylindrical
TEB120A2-14C12-83	●	12	12	14	83	Cylindrical
TEB160A2-16C16-92	●	16	16	16	92	Cylindrical
TEB200A2-20C20-104	●	20	20	20	104	Cylindrical

Short and stable design for profiling (roughing).

SOLIDMEISTER TUNGALOY

TEB**A3...

3 flutes ball nose, 30° helix, short length



Designation	AH725	D	d	ap	L	Shank
TEB030A3-05C06-57	●	3	6	5	57	Cylindrical
TEB040A3-07C06-57	●	4	6	7	57	Cylindrical
TEB050A3-08C06-57	●	5	6	8	57	Cylindrical
TEB060A3-08C06-57	●	6	6	9	57	Cylindrical
TEB080A3-11C08-63	●	8	8	11	63	Cylindrical
TEB100A3-13C10-72	●	10	10	13	72	Cylindrical
TEB120A3-14C12-83	●	12	12	14	83	Cylindrical
TEB160A3-16C16-92	●	16	16	16	92	Cylindrical
TEB200A3-20C20-104	●	20	20	20	104	Cylindrical

Short and stable design for contouring (roughing).

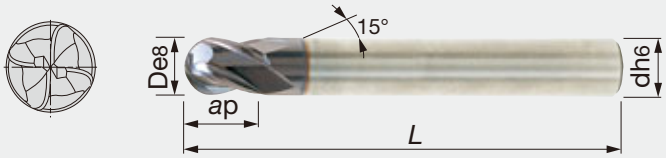
Reference pages

Standard cutting conditions → **D307**, **D309**

●: Line up

TEB**A4...

4 flutes ball nose, 30° helix, short length



Designation	AH725	D	*d*	*ap*	*L*	Shank
TEB030A4-05C06-57	●	3	6	5	57	Cylindrical
TEB040A4-07C06-50	●	4	6	7	50	Cylindrical
TEB050A4-08C06-57	●	5	6	8	57	Cylindrical
TEB060A4-08C06-57	●	6	6	9	57	Cylindrical
TEB080A4-11C08-63	●	8	8	11	63	Cylindrical
TEB100A4-13C10-72	●	10	10	13	72	Cylindrical
TEB120A4-14C12-83	●	12	12	14	83	Cylindrical
TEB160A4-16C16-92	●	16	16	16	92	Cylindrical
TEB200A4-20C20-104	●	20	20	20	104	Cylindrical

Short and stable design for profiling (finishing).

Reference pages

Standard cutting conditions → **D307**, **D309**

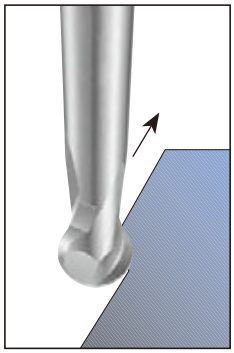
●: Line up

Ball Nose Characteristics

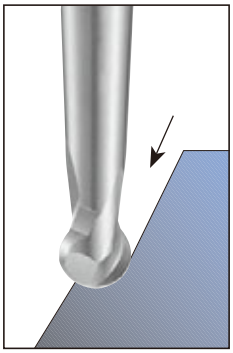
- Die & mold making, turbine manufacturing and aircraft industry, etc.
- Useful for intricate-shaped surfaces.
- Profiling of up to 70 HRC high hardened steels and alloy steels, nickel based alloys, titanium alloys.
- Ultra-fine grain carbide which increases both toughness and hardness.
- Suitable for dry and high speed cutting.
- Special sphere shaped tool geometry provides increased tool life and enables higher speed and feed operations.

Milling Features

- Operating angle 208° - 212°
- Excellent surface roughness and high milling process.
- Enables milling with high speed and feed in back milling mode.



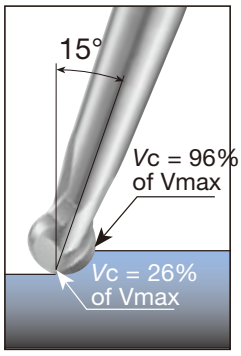
Favorable Back Milling



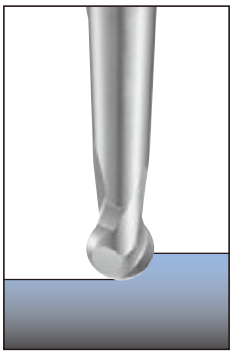
Unfavorable Drilling

Operating Recommendations

- It is recommended to machine with the tool inclined at a 15° angle. This technique eliminates cutting at nearly zero speed at the tool axis. Cutting is more efficient, and tool life substantially improves.
- Decreased cutting force.
- Excellent surface roughness and brightness.



Favorable Profiling



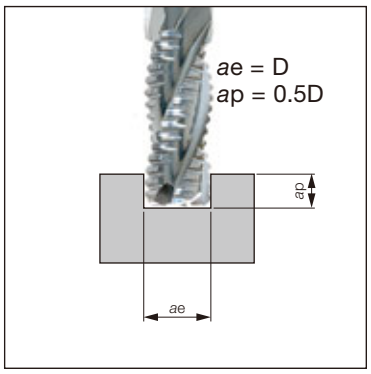
Unfavorable Profiling

MACHINING DATA FOR SHREDMEISTER ROUGHER ENDMILLS

ISO	Material		Condition	Tensile Strength (N/mm2)	Hardness HB	Cutting speed: *Vc* (m/min) min	max
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	260	280
		≥ 0.25 %C	Annealed	650	190	200	230
		< 0.55 %C	Quenched and tempered	850	250	160	190
		≥ 0.55 %C	Annealed	750	220	160	180
		≥ 0.55 %C	Quenched and tempered	1000	300	140	160
	Low alloy steel and cast steel (less than 5% all elements)		Annealed	600	200	160	190
			Quenched and tempered	930	275	120	140
			Quenched and tempered	1000	300	130	150
			Quenched and tempered	1200	350	140	160
	High alloy steel, cast steel, and tool steel		Annealed	680	200	130	160
			Quenched and tempered	1100	325	70	90
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	110	200
			Martensitic	820	240	60	180
			Austenitic	600	180	80	120
K	Cast iron nodular (GGG)		Ferritic / pearlitic	-	180	80	260
			Pearlitic	-	260	130	240
	Grey cast iron (GG)		Ferritic	-	160	150	280
			Pearlitic	-	250	90	280
	Malleable cast iron		Ferritic	-	130	150	280
			Pearlitic	-	230	140	240
N	Aluminium-wrought alloy		Not cureable	-	60	810	840
			Cured	-	100	730	830
	Aluminium-cast, alloyed	≤ 12% Si	Not cureable	-	75	800	840
			Cured	-	90	730	830
		> 12% Si	High temperature	-	130	320	340
	Copper alloys	> 1% Pb	Free cutting	-	110	400	430
			Brass	-	90	400	430
			Electrolitic copper	-	100	270	300
	Non-metallic		Duroplastics, fiber plastics	-	-	-	-
			Hard rubber	-	-	-	-
S	High temp. alloys	Fe based	Annealed	-	200	20	40
		Fe based	Cured	-	280	20	30
		Ni or Co based	Annealed	-	250	20	30
		Ni or Co based	Cured	-	350	20	30
		Ni or Co based	Cast	-	320	30	70
	Titanium and Ti alloys			RM 400	-	30	70
			Alpha + beta alloys cured	RM 1050	-	30	70
H	Hardened steel		Hardened	-	55 HRC	30	50
			Hardened	-	60 HRC	30	40
	Chilled cast iron		Cast	-	400	60	80
	Cast iron		Hardened	-	55 HRC	30	50

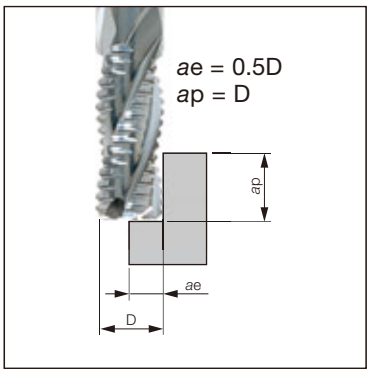
Recommended Feeds

Slotting



D (mm)	Min. *fz*	Max. *fz*
1	0.006	0.01
1.3	0.006	0.02
1.5	0.006	0.04
1.8	0.01	0.05
2	0.01	0.06
2.3	0.01	0.06
2.5	0.01	0.06
2.8	0.02	0.07
3	0.02	0.08
3.3	0.02	0.08
4	0.03	0.09
4.3	0.03	0.09
5	0.04	0.1
6	0.05	0.12
7	0.06	0.14
8	0.06	0.16
9	0.06	0.16
10	0.06	0.18
12	0.07	0.2
14	0.08	0.22
16	0.1	0.24
18	0.1	0.26
20	0.1	0.3
25	0.12	0.3

Shoulder milling



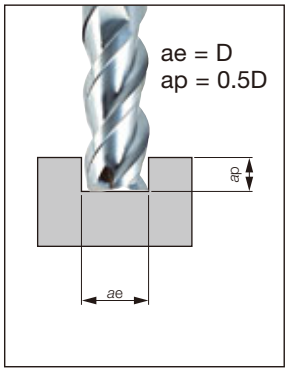
D (mm)	Min. *fz*	Max. *fz*
1	0.006	0.014
1.3	0.006	0.024
1.5	0.006	0.044
1.8	0.01	0.056
2	0.01	0.066
2.3	0.01	0.066
2.5	0.01	0.066
2.8	0.02	0.076
3	0.02	0.088
3.3	0.02	0.088
4	0.03	0.098
4.3	0.03	0.098
5	0.04	0.11
6	0.05	0.132
7	0.06	0.154
8	0.06	0.176
9	0.06	0.176
10	0.06	0.196
12	0.07	0.216
14	0.08	0.238
16	0.1	0.26
18	0.1	0.28
20	0.1	0.34
25	0.12	0.36

MACHINING DATA FOR SOLID CARBIDE ENDMILLS

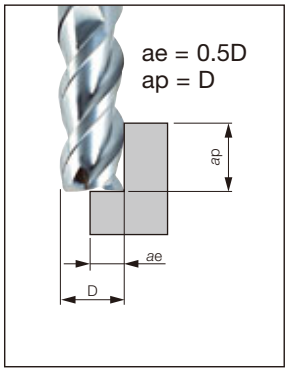
ISO	Material		Condition	Tensile Strength (N/mm2)	Hardness HB	Cutting speed: *Vc* (m/min) min	max
P	Non-alloy steel and cast steel, free cutting steel	< 0.25 %C	Annealed	420	125	220	230
		≥ 0.25 %C	Annealed	650	190	170	190
		< 0.55 %C	Quenched and tempered	850	250	140	150
		≥ 0.55 %C	Annealed	750	220	140	150
		≥ 0.55 %C	Quenched and tempered	1000	300	120	130
	Low alloy steel and cast steel (less than 5% all elements)		Annealed	600	200	140	150
			Quenched and tempered	930	275	100	110
			Quenched and tempered	1000	300	110	120
			Quenched and tempered	1200	350	120	130
	High alloy steel, cast steel, and tool steel		Annealed	680	200	110	130
			Quenched and tempered	1100	325	60	70
M	Stainless steel and cast steel		Ferritic / martensitic	680	200	100	170
			Martensitic	820	240	60	150
			Austenitic	600	180	70	100
K	Cast iron nodular (GGG)		Ferritic / pearlitic	-	180	70	220
			Pearlitic	-	260	110	200
	Grey cast iron (GG)		Ferritic	-	160	130	230
			Pearlitic	-	250	70	230
	Malleable cast iron		Ferritic	-	130	130	230
			Pearlitic	-	230	110	200
N	Aluminium-wrought alloy		Not cureable	-	60	670	700
			Cured	-	100	610	690
	Aluminium-cast, alloyed	≤ 12% Si	Not cureable	-	75	670	700
			Cured	-	90	610	690
		> 12% Si	High temperature	-	130	270	280
	Copper alloys	> 1% Pb	Free cutting	-	110	330	350
			Brass	-	90	330	350
			Electrolitic copper	-	100	230	250
	Non-metallic		Duroplastics, fiber plastics	-	-	-	-
			Hard rubber	-	-	-	-
S	High temp. alloys	Fe based	Annealed	-	200	20	30
		Fe based	Cured	-	280	20	20
		Ni or Co based	Annealed	-	250	20	20
		Ni or Co based	Cured	-	350	20	20
		Ni or Co based	Cast	-	320	30	60
	Titanium and Ti alloys			RM 400	-	30	60
			Alpha + beta alloys cured	RM 1050	-	30	60
H	Hardened steel		Hardened	-	55 HRC	30	40
			Hardened	-	60 HRC	30	30
	Chilled cast iron		Cast	-	400	50	60
	Cast iron		Hardened	-	55 HRC	30	40

Recommended Feeds

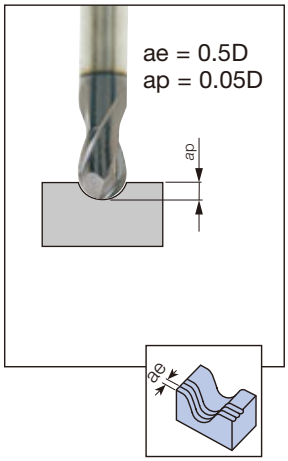
Slotting



Shoulder milling



Profiling



Slotting			Shoulder milling / Profiling	
D (mm)	Min. *fz*	Max. *fz*	Min. *fz*	Max. *fz*
1	0.003	0.005	0.003	0.007
1.3	0.003	0.01	0.003	0.012
1.5	0.003	0.02	0.003	0.022
1.8	0.005	0.025	0.005	0.028
2	0.005	0.03	0.005	0.033
2.3	0.005	0.03	0.005	0.033
2.5	0.005	0.03	0.005	0.03
2.8	0.01	0.035	0.01	0.038
3	0.01	0.04	0.01	0.044
3.3	0.015	0.04	0.01	0.044
4	0.015	0.045	0.015	0.049
4.3	0.020	0.045	0.015	0.049
5	0.025	0.05	0.02	0.055
6	0.03	0.06	0.025	0.066
7	0.03	0.07	0.03	0.077
8	0.03	0.08	0.03	0.088
9	0.03	0.08	0.03	0.088
10	0.035	0.09	0.03	0.098
12	0.04	0.1	0.035	0.108
14	0.05	0.11	0.04	0.119
16	0.05	0.12	0.05	0.13
18	0.05	0.13	0.05	0.14
20	0.05	0.15	0.05	0.17
25	0.06	0.15	0.06	0.18

1. For Slotting	M type materials	—	*ap* max = 0.5D
	S type materials	—	*ap* max = 0.25D
2. For Finishing	P type materials	—	*ap* max = 1.5D
3. For Roughing			*ap* max = 1.5D
			V = 1.25 x *Vc*

High speed cutting on Hard materials (up to 60 HRC):
Apply small depth of cut: *ap* (0.1 - 0.3 mm) at *Vc* 80 - 160 m/min

GRADE PRIORITIES FOR SOLID CARBIDE ENDMILLS

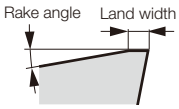
In most cases the best performance can be attained without using coolant for specific grades. However, it should be noted that if for any reason coolant must be used, it could possibly affect tool life and sometimes cause insert failure, due to thermal shock.

Material Groups	ISO P	ISO H	ISO M	ISO S	ISO K	ISO N
	Steel	Hard Materials	Stainless	Superalloys	Cast Iron	Non-ferrous
	Harder AH750 **AH725** Tougher	Harder **AH750** AH725 Tougher	Harder **AH725** Tougher	Harder AH750 **AH725** KS15F Tougher	Harder AH750 **AH725** Tougher	Harder AH725 **KS15F** Tougher

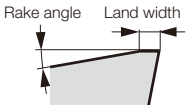
■ First choice

Milling Insert

● ACMT**PR-MJ

Shape	Designation	Coated				Applicable mills
		AH120	AH140	GH330	T3130	
	ACMT060308PR-MJ	●	●	●	●	ELP07/09/12... Page D094
	ACMT07T308PR-MJ	●	●	●	●	
 -MJ	ACMT100408PR-MJ	●	●	●	●	

● ADMT**PR-MJ

Shape	Designation	Coated			Applicable mills
		AH120	AH140	T3130	
	ADMT130308PR-MJ	●	●	●	ELP13/17/21... Page D094
	ADMT17T308PR-MJ	●	●	●	
 -MJ	ADMT210408PR-MJ	●	●	●	

● AECW**PEFR, AECW**PESR, AEMW**PEFR, AEMW**PETR

Shape	Designation	Coated		Cermet	Uncoated		Applicable mills
		AH120	GH330	NS740	UX30	TH10	
	AECW1403PEFR					●	EPE4000/5000/6000... Page D097
	AECW1403PESR	●	●	●	●		
	AECW16T3PEFR					●	
	AECW16T3PESR	●	●	●	●		
	AECW1804PEFR					●	
	AECW1804PESR	●	●	●	●		
	AEMW1403PEFR					●	
	AEMW1403PETR		●	●	●		
	AEMW16T3PEFR					●	
	AEMW16T3PETR		●	●	●		
	AEMW1804PEFR					●	
	AEMW1804PETR		●	●	●		

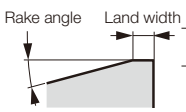
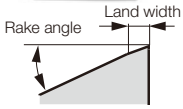
● ANEA542TN, ANEA642TN

Shape	Designation	Uncoated	Applicable mills
		UX30	
	ANEA542TN	●	VSN... (Former products)
	ANEA642TN	●	

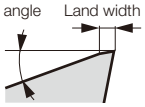
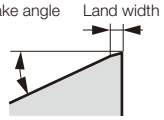
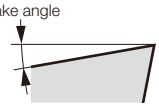
●: Line up

Milling Insert

● ANMT**PPPR-MJ, ANMT**PPPR-ML

Shape	Designation	Coated												Applicable mills
		AH120	GH330	T3130										
 -MJ	ANMT09T3PPPR-MJ	●	●	●										EPN09 (Former products)
	ANMT09T3PPPR-ML	●												
	ANMT1404PPPR-MJ	●	●	●										EPN14... TPN14... (Former products)
	ANMT1404PPPR-ML	●												
 -ML														

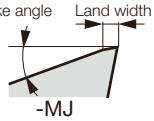
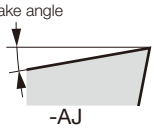
● AOMT**PDPR-MJ, AOGT**PDFR-AJ, AOMT070208PDPR-HJ

Shape	Designation	Coated			Uncoated									Applicable mills
		AH140	AH725		KS15F									
 -MJ	AOMT070202PDPR-MJ	●	●											TUNGREC TPO07... Page D054 EPO07... Page D054 HPO07... Page D055
	AOMT070204PDPR-MJ	●	●											
	AOMT070208PDPR-MJ	●	●											
	AOMT070216PDPR-MJ	●	●											
	AOMT070208PDPR-HJ	●	●											
	AOGT070204PDFR-AJ				●									
 -HJ														
 -AJ														

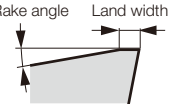
●: Line up

Milling Insert

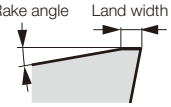
● AOMT**PDPR-MJ, AOGT**PDFR-AJ

Shape	Designation	Coated			Uncoated										Applicable mills
		AH140	AH725		KS15F										
Rake angle Land width  -MJ	AOMT180508PDPR-MJ	●	●												TUNGREC TPO18... Page D065 EPO18... Page D066
	AOMT180516PDPR-MJ	●	●												
	AOMT180524PDPR-MJ	●	●												
	AOMT180532PDPR-MJ	●	●												
	AOGT180504PDFR-AJ				●										
	AOGT180508PDFR-AJ				●										
Rake angle  -AJ															

● APMT**PN-MJ

Shape	Designation	Coated													Applicable mills
		AH120	AH140	GH330	T3130										
Rake angle Land width  -MJ	APMT070308PN-MJ	●	●	●	●										ELP07/09/12... Page D094
	APMT09T308PN-MJ	●	●	●	●										
	APMT120408PN-MJ	●	●	●	●										

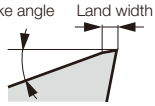
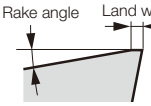
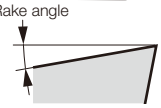
● APMT120416PR-MJ

Shape	Designation	Coated													Applicable mills
		AH120	T3130												
Rake angle Land width  -MJ	APMT120416PR-MJ	●	●												TZP12... Page D218 HZP12... Page D267

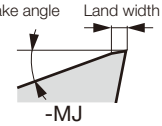
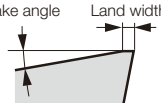
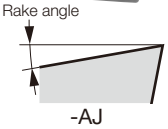
●: Line up

Milling Insert

● ASMT**PDPR-MJ, ASGT11**PDFR-AJ, ASMT11T304PDPR-MS

Shape	Designation	Coated								Cermet	Uncoated			Applicable mills
		AH120	AH130	AH140	AH725	T1115	T1215	T3130	DS1100	NS740	KS05F			
Rake angle Land width  -MJ	ASMT11T304PDPR-MJ	●			●	●		●		●				TUNGREC
	ASMT11T308PDPR-MJ	●	●		●	●	●	●		●				TPO11... Page D058
	ASMT11T312PDPR-MJ	●			●			●						
	ASMT11T316PDPR-MJ	●			●			●		●				TLS11... Page D058
	ASMT11T320PDPR-MJ	●												
	ASMT11T330PDPR-MJ	●												EPO11... Page D059
	ASMT11T304PDPR-MS		●	●										
Rake angle Land width  -MS	ASGT11T304PDFR-AJ								●		●			HPO11... Page D060
	ASGT11T308PDFR-AJ								●		●			
Rake angle  -AJ														ELS11... Page D060

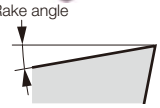
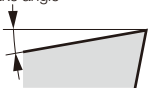
● ASMT17**PDPR-MJ, ASGT17**PDFR-AJ, ASMT170508PDPR-MS

Shape	Designation	Coated						Cermet	Uncoated					Applicable mills
		AH120	AH130	AH140	T1115	T3130	DS1100	NS740	KS05F					
Rake angle Land width  -MJ	ASMT170504PDPR-MJ	●			●	●		●						TPS17... Page D099
	ASMT170508PDPR-MJ	●			●	●		●						
	ASMT170512PDPR-MJ	●				●								EPS17... Page D099
	ASMT170516PDPR-MJ	●				●		●						
	ASMT170520PDPR-MJ	●												
	ASMT170530PDPR-MJ	●												
	ASMT170532PDPR-MJ	●				●		●						
	ASMT170508PDPR-MS		●	●										
Rake angle Land width  -MS	ASGT170504PDFR-AJ						●		●					
	ASGT170508PDFR-AJ						●		●					
Rake angle  -AJ														

●: Line up

Milling Insert

● AVGT**PBER-MJ, AVGT**PBFR-AJ

Shape	Designation	Coated		Uncoated	Applicable mills
		AH120	AH3135	KS05F	
Rake angle  -MJ	AVGT060302PBER-MJ	●	●		TUNGFREC EPAV... Page D050
	AVGT060304PBER-MJ	●	●		
	AVGT060308PBER-MJ	●	●		
	AVGT060302PBFR-AJ			●	HPAV06... Page D050
	AVGT060304PBFR-AJ			●	
	AVGT060308PBFR-AJ			●	
Rake angle  -AJ					

● CPMW**-EN, CPMT**-EN

Shape	Designation	Coated	Uncoated	Applicable mills
		GH330	UX30	
	CPMW050208EN	●	●	EVP1000 (Former products)
	CPMW06T208EN	●	●	
	CPMT080308EN	●	●	

● DCMW**TN

Shape	Designation	Coated		Applicable mills
		AH120	AH330	
	DCMW070204TN	●	●	EBP... Page D212
	DCMW11T304TN	●	●	HBP... Page D269

● DPCW11T3ZFR

Shape	Designation	Coated	Cermet	Applicable mills
		AH740	NS740	
	DPCW11T3ZFR	●	●	TZF11... Page D220 HZF11... Page D268

●: Line up

Milling Insert

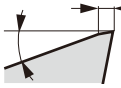
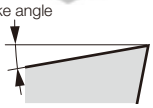
● EDKW53ZTR

Shape	Designation	Coated			Uncoated									Applicable mills
		GH330			UX30									
	EDKW53ZTR	●			●									ESD5000 (Former products)

● ENEQ**TN-T

Shape	Designation	Coated												Applicable mills
		AH120												
	ENEQ090508TN-T	●												VSNE09... (Former products)
	ENEQ100508TN-T	●												VSNE10... (Former products)
	ENEQ130608TN-T	●												VSNE13... (Former products)
	ENEQ160608TN-T	●												VSNE16... (Former products)

● GDMT**PDPR-MJ, GDGT**PDFR-AJ

Shape	Designation	Coated					Uncoated							Applicable mills
		AH120	AH140	AH330	T3130	DS1100	UX30	TH10						
	GDMT10H3PDPR-MJ	●	●	●	●		●							ESD10/17... Page D104
	GDMT17X6PDPR-MJ	●	●	●	●		●							
Rake angle Land width  -MJ	GDGT10H3PDFR-AJ					●		●						HSD10/17... Page D268
	GDGT17X6PDFR-AJ					●		●						
Rake angle  -AJ														

●: Line up

Milling Insert

Insert

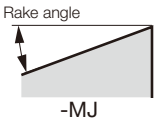
● HEHN532FN

Shape	Designation	Uncoated												Applicable mills
		TH10												
	HEHN532FN	●												QYE5300 (Former products)

● HPKN532FN

Shape	Designation	Uncoated												Applicable mills
		TH10												
	HPKN532FN	●												QYP5300 (Former products)

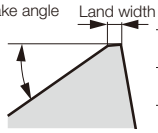
● LMEU**ZNEN-MJ

Shape	Designation	Coated												Applicable mills
		AH120	AH140	AH725										
 -MJ	LMEU100808ZNEN-MJ	●	●	●										TECTSLOT ASN 10/12/15... Page D180 TSN 10/12/15... Page D181
	LMEU100816ZNEN-MJ	●	●	●										
	LMEU100824ZNEN-MJ	●	●	●										
	LMEU100832ZNEN-MJ	●	●	●										
	LMEU120808ZNEN-MJ	●	●	●										
	LMEU120816ZNEN-MJ	●	●	●										
	LMEU120824ZNEN-MJ	●	●	●										
	LMEU120832ZNEN-MJ	●	●	●										
	LMEU150908ZNEN-MJ	●	●	●										
	LMEU150916ZNEN-MJ	●	●	●										
	LMEU150924ZNEN-MJ	●	●	●										
	LMEU150932ZNEN-MJ	●	●	●										

●: Line up

Milling Insert

● LMMU**PNER-MJ

Shape	Designation	Coated					Applicable mills
		AH120	AH140	AH725	T1115	T3130	
	LMMU110708PNER-MJ	●	●	●	●	●	TECMILL TPM11/16... Page D083 TLM11... Page D083 EPM11... Page D084
	LMMU110716PNER-MJ	●	●	●	●	●	
	LMMU110724PNER-MJ	●	●	●	●	●	
Rake angle Land width	LMMU110732PNER-MJ	●	●	●	●	●	
	LMMU160908PNER-MJ	●	●	●	●	●	
	LMMU160916PNER-MJ	●	●	●	●	●	
	LMMU160924PNER-MJ	●	●	●	●		
-MJ	LMMU160932PNER-MJ	●	●	●	●		

● LNCA64ZTR

Shape	Designation	Coated	Uncoated	Applicable mills
		T3130	UX30	
	LNCA64ZTR	●	●	VSN6000I (Former products)

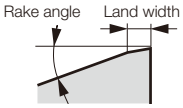
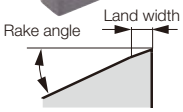
● LNCQ0906N-**L, LNCQ0906R-50S

Shape	Designation	Coated		Cermet	Applicable mills
		AH120	GH110	NS740	
	LNCQ0906N-100L	●	●	●	EMS09... Page D166
	LNCQ0906N-50L	●	●	●	
	LNCQ0906R-50S	●	●	●	
Rake angle 					

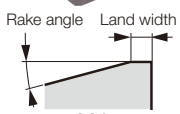
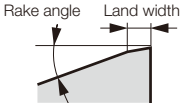
●: Line up

Milling Insert

● LNMU0303ZER-MJ, LNMU0303ZER-ML

Shape	Designation	Coated				Applicable mills
		AH130	AH725	AH3035	AH8015	
 -MJ	LNMU0303ZER-MJ	●	●	●	●	DOFEED TXN03... Page D008 EXN03... Page D008 HXN03... Page D009
 -ML	LNMU0303ZER-ML	●	●	●	●	

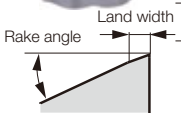
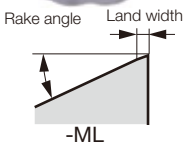
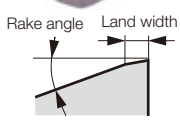
● LNMU06X5ZER-MJ, LNMU06X5ZER-ML, LNGU06X5ZER-W

Shape	Designation	Coated					Applicable mills
		AH120	AH130	AH725	AH3035	AH8015	
 -MJ	LNMU06X5ZER-MJ	●	●	●	●	●	DOFEED TXN06... Page D012 EXN06... Page D013
 -ML	LNMU06X5ZER-ML	●	●	●	●	●	
-W	LNGU06X5ZER-W			●			

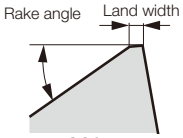
●: Line up

Milling Insert

● LNMX0405R4-MJ, LNMX0405R4-ML, LNMX0405R4-HJ

Shape	Designation	Coated													Applicable mills
		AH120	AH3135												
 -MJ	LNMX0405R4-MJ	●	●												DOTBALL TWIST TXLN... Page D016 EXLN... Page D016 HXLN... Page D017
	LNMX0405R4-ML	●	●												
	LNMX0405ZER-HJ	●	●												
 -ML															
 -HJ															

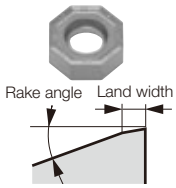
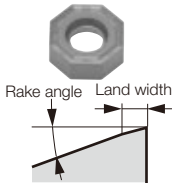
● LQMU**PNER-MJ

Shape	Designation	Coated													Applicable mills
		AH120	AH140	AH725											
 -MJ	LQMU110704PNER-MJ	●	●	●											DOREC TPQ11/18... Page D080 EPQ11/18... Page D081
	LQMU110708PNER-MJ	●	●	●											
	LQMU110716PNER-MJ	●	●	●											
	LQMU110720PNER-MJ	●													
	LQMU180804PNER-MJ	●	●	●											
	LQMU180808PNER-MJ	●	●	●											
	LQMU180816PNER-MJ	●	●	●											
	LQMU180824PNER-MJ	●	●	●											

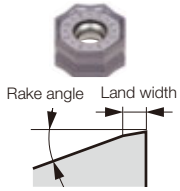
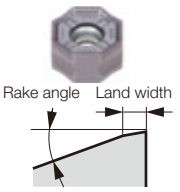
●: Line up

Milling Insert

● ONMU0705ANPN-MJ, ONHU0705ANPN-MJ, ONMU0705ANPN-ML, ONHU0705ANTN-ML, ONHU0705ANPR-W

Shape	Designation	Coated																		Applicable mills
		AH120	AH140	AH725	AH3135	T1115	T1215													
 -MJ	ONMU0705ANPN-MJ		●	●	●	●	●													DOOCTO DOQUAD TAN07... Page D121
	ONHU0705ANPN-MJ		●	●																
	ONMU0705ANPN-ML	●			●															
	ONHU0705ANTN-ML	●	●	●																
	ONHU0705ANPR-W	●																		
 -ML																				
-W																				

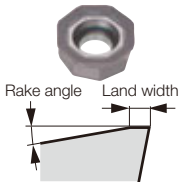
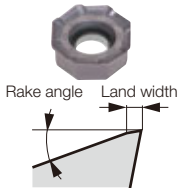
● ONGU0507ANEN-MJ, ONGU0507ANEN-W, ONMU0507ANEN-MJ

Shape	Designation	Coated																		Applicable mills
		AH120	AH3135	T3225	T1215															
 -MJ	ONGU0507ANEN-MJ	●	●	●																DOTMILL TASN13... Page D118
	ONGU0507ANEN-W	●	●																	
	ONMU0507ANEN-MJ	●	●	●	●															
 -W																				

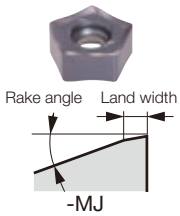
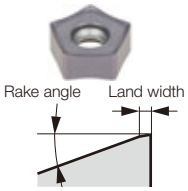
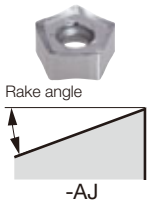
●: Line up

Milling Insert

● OWMT0807ZNER-HJ, OWMT0807AAER-ML

Shape	Designation	Coated													Applicable mills
		AH130	AH3135												
 -HJ	OWMT0807ZNER-HJ		●												DOOCTO DOQUAD TAN07... Page D121
 -ML	OWMT0807AAER-ML	●	●												

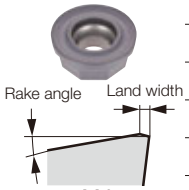
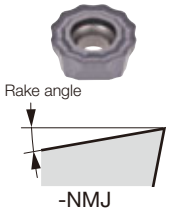
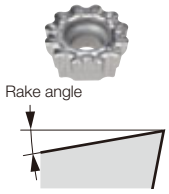
● PNCU0905GNER-MJ, PNCU0905GNEN-ML, PNCU0905GNFR-AJ, PNMU0905GNEN-MJ, PNCU0905GNER-W

Shape	Designation	Coated							Cermet		Uncoated				Applicable mills
		AH120	AH140	AH725	AH3135	T1115	T1215	T3130	NS740		TH10				
 -MJ	PNCU0905GNER-MJ	●	●	●		●		●	●						DOPENT TEN09R/L... Page D127 EEN09... Page D128
	PNCU0905GNEN-ML				●										
	PNCU0905GNFR-AJ										●				
	PNMU0905GNEN-MJ	●			●		●								
	PNCU0905GNER-W			●											
 -ML															
 -AJ															
-W															

●: Line up

Milling Insert

● RCMT**EN-MJ, RCMT**EN-NMJ, RCMT**FN-NAJ

Shape	Designation	Coated			Uncoated		Applicable mills
		AH120	AH140	AH725	KS15F		
 -MJ	RCMT1204EN-MJ	●	●	●			ROUNDSPLIT TRC12/16... Page D199 ERC12/16... Page D200
	RCMT1204EN-NMJ	●	●	●			
	RCMT1204FN-NAJ				●		
	RCMT1606EN-MJ	●	●	●			
	RCMT1606EN-NMJ	●	●	●			
	RCMT1606FN-NAJ				●		
 -NMJ							
 -NAJ							

● RDCA2004TN, RDCN2004TN, RDKN2004...

Shape	Designation	Coated	Uncoated		Applicable mills
		AH120	UX30	TH10	
	RDCA2004TN		●		ERD6000 Page D162
	RDCN2004TN		●		
	RDKN2004FN			●	
	RDKN2004TN	●	●		

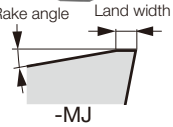
● RDCM1203TN, RDMA1203TN

Shape	Designation	Uncoated	Applicable mills
		UX30	
	RDCM1203TN	●	ERD4000 (Former products)
	RDMA1203TN	●	

●: Line up

Milling Insert

● RDMT**ZDPN-MJ, RDMW**ZDSN

Shape	Designation	Coated					Uncoated							Applicable mills
		AH120	AH130	AH140	AH330	T3130	UX30							
	RDMT1204ZDPN-MJ	●		●	●	●	●							TRD12/16... Page D204
	RDMW1204ZDSN	●		●		●								
	RDMT1606ZDPN-MJ	●	●	●	●	●	●							ERD12/16... Page D204
-MJ	RDMW1606ZDSN	●		●		●								

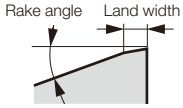
● RDMW**M0

Shape	Designation	Coated												Applicable mills
		AH120												
	RDMW0501M0	●												EWD05/07/10... Page D208
	RDMW0702M0	●												
	RDMW1003M0	●												HWD07... Page D208

● RFEN2004ZFTN, RFEN2004M0TN

Shape	Designation	Coated			Uncoated									Applicable mills
		AH120	GH330		UX30	KS20								
	RFEN2004ZFTN	●	●		●	●								TRF6000 Page D164
	RFEN2004M0TN		●		●	●								
														ERF6000 Page D164

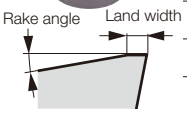
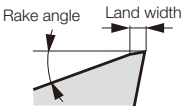
● RNGU1307ZNER-MJ, RNMU1307ZNER-MJ

Shape	Designation	Coated												Applicable mills
		AH120	AH3135	T1215	T3225									
	RNGU1307ZNER-MJ	●	●											DOTMILL TASN13... Page D118
	RNMU1307ZNER-MJ	●	●	●	●									
 -MJ														

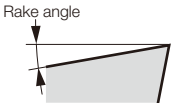
●: Line up

Milling Insert

● RPMT**EN-MJ, RPMT**EN-ML

Shape	Designation	Coated											Applicable mills
		AH130	AH725	AH4035									
 -MJ	RPMT10T3EN-MJ	●	●	●									FIXRMILL TRP10/12/16... Page D194 ERP10/12/16... Page D194 HRP10/12... Page D195
	RPMT10T3EN-ML	●	●	●									
	RPMT1204EN-MJ	●	●	●									
	RPMT1204EN-ML	●	●	●									
	RPMT1606EN-MJ	●	●	●									
	RPMT1606EN-ML	●	●	●									
 -ML													

● SCMT**-23

Shape	Designation	Coated											Applicable mills
		AH120											
 -23	SCMT09T308-23	●											EBD... Page D214 HBD... Page D270
	SCMT120408-23	●											

●: Line up

Milling Insert

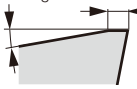
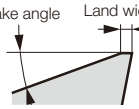
● SDCN42HTR, SDKN42HTR

Shape	Designation	Coated														Applicable mills
		GH330														
	SDCN42HTR	●														EUD4600 (Former products)
	SDKN42HTR	●														

● SDKN42EF..., SDEN42EFTR24

Shape	Designation	Coated			Cermet			Uncoated								Applicable mills
		T3130			NS740			TH10	UX30							
	SDKN42EFTR	●			●											TMD4100I (Former products)
	SDKN42EFFR							●								
	SDEN42EFTR24				●				●							

● SDCN42Z..., SDEN42Z..., SDKN42Z..., SDCN42ZFN-DIA, SDKR42ZSR-MJ, SDMR1203AETN-MJ, SDKR1203AETN-MJ, SDKR42ZPN-MS

Shape	Designation	Coated							Cermet		Uncoated		PCD			Applicable mills
		AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740	N308	UX30	TH10	DX140			
	SDCN42ZFN											●				EMD4400RI Page D149
	SDCN42ZTN								●	●	●					
	SDCN42ZTN20								●							EGD4400 Page D154
	SDEN42ZFN											●				
	SDEN42ZTN	●		●		●	●		●	●	●					
	SDEN42ZTNCR	●		●	●				●							
Rake angle / Land width  -MJ	SDEN42ZTN20							●								
	SDKN42ZFN											●				
	SDKN42ZTN	●	●	●	●	●	●		●	●	●					
	SDKN42ZTNCR								●							
Rake angle / Land width  -MS	SDKN42ZTN16							●								
	SDCN42ZFN-DIA												●			
	SDKR42ZSR-MJ	●			●	●		●								
	SDMR1203AETN-MJ								●							
	SDKR1203AETN-MJ								●							
	SDKR42ZPN-MS		●	●												

DX140: Packing quantity = 1pc.

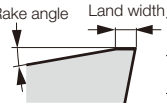
●: Line up

Milling Insert

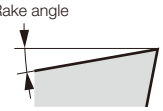
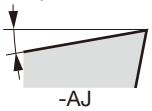
●SDCN53HTR, SDKN53HTR

Shape	Designation	Coated															Applicable mills
		GH330															
	SDCN53HTR	●															TUD5600 (Former products)
	SDKN53HTR	●															

● SDCN53ZTN, SDEN53Z..., SDKN53Z..., SDKR53ZSR-MJ

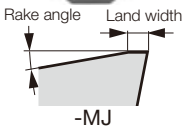
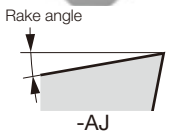
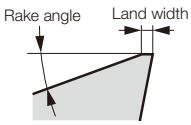
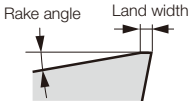
Shape	Designation	Coated					Cermet			Uncoated							Applicable mills
		AH120	AH130	AH140	GH330	T3130	NS740	N308		UX30	TH10						
	SDCN53ZTN						●	●									TMD5400RI Page D152
	SDEN53ZFN										●						
	SDEN53ZTN				●		●			●							
	SDEN53ZTNCR						●										
	SDEN53ZTN20					●											
	SDKN53ZFN										●						
Rake angle Land width  -MJ	SDKN53ZTN	●	●	●	●		●	●		●							
	SDKN53ZTNCR						●										
	SDKN53ZTN16					●											
	SDKR53ZSR-MJ				●	●											

● SDMT050204PN-MJ, SDHT050204FN-AJ

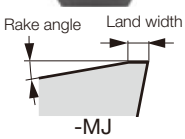
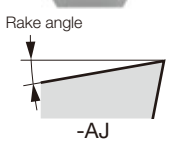
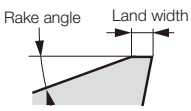
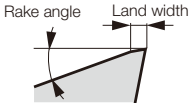
Shape	Designation	Coated			Uncoated												Applicable mills
		AH140	AH725		TH10												
	SDMT050204PN-MJ	●	●														TUNGQUAD TPD05... Page D070 EPD05... Page D070 ELD05... Page D070
	SDHT050204FN-AJ				●												
Rake angle  -MJ																	
Rake angle  -AJ																	

●: Line up

● **SDMT1204AFPN-MJ, SDMT1204AFTN-MJ, SDMT1204AFPN-ML, SDMT1204AFPN-MS, SDGT1204AFTN-MJ, SDGT1204AFFN-AJ**

Shape	Designation	Coated					Cermet			Uncoated				Applicable mills
		AH120	AH140	AH330	GH330	T3130	NS740			TH10				
 -MJ	SDMT1204AFPN-MJ	●	●	●	●	●								TAD12... EAD12... (Former products)
	SDMT1204AFTN-MJ						●							
	SDMT1204AFPN-ML	●		●										
	SDMT1204AFPN-MS		●											
	SDGT1204AFTN-MJ	●		●			●							
	SDGT1204AFFN-AJ									●				
 -AJ														
 -ML														
 -MS														

● **SDMT1204PDSR-MJ, SDMT1204PDTR-MJ, SDMT1204PDPR-ML, SDMT1204PDPR-MS SDGT1204PDTR-MJ, SDGT1204PDFR-AJ**

Shape	Designation	Coated					Cermet			Uncoated				Applicable mills
		AH120	AH140	AH330	GH330	T3130	NS740			TH10				
 -MJ	SDMT1204PDSR-MJ	●	●	●	●	●								TPD12... EPD12... (Former products)
	SDMT1204PDTR-MJ						●							
	SDMT1204PDPR-ML	●		●										
	SDMT1204PDPR-MS		●											
	SDGT1204PDTR-MJ	●		●			●							
	SDGT1204PDFR-AJ									●				
 -AJ														
 -ML														
 -MS														

●: Line up

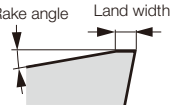
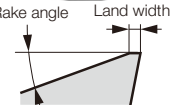
Milling Insert

Insert

● SDMW090308TN, SDMW120408TN

Shape	Designation	Uncoated															Applicable mills
		UX30															
	SDMW090308TN	●															ELD3000 ELD4000 (Former products)
	SDMW120408TN	●															

● SECN1203AGFN, SEEN1203AG..., SEKN1203AG..., SEKR1203AGSR-MJ, SEKR1203AGPN-MS

Shape	Designation	Coated							Cermet		Uncoated						Applicable mills
		AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740		UX30	TH10					
	SECN1203AGFN											●					TME4400RI Page D144
	SEEN1203AGFN											●					
	SEEN1203AGTN	●	●	●		●	●		●		●						TME4400RB Page D145
	SEEN1203AGTN-T							●	●		●						
	SEEN1203AGTNCR	●	●	●	●			●									EME4400 Page D146
	SEEN1203AGTNCR-14								●								
Rake angle Land width  -MJ	SEKN1203AGFN-T											●					
	SEKN1203AGTN	●	●	●	●	●		●	●		●						
	SEKN1203AGTN-T					●	●	●	●		●						
	SEKN1203AGTNCR								●								
	SEKR1203AGSR-MJ	●			●	●		●									
	SEKR1203AGPN-MS		●	●													
Rake angle Land width  -MS																	

● SECN422TN, SECN422FN, SEEN422TN, SEEN422FN, SECN422FN-DIA

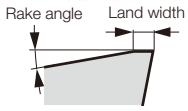
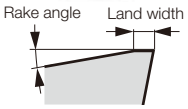
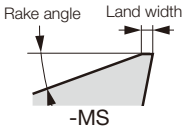
Shape	Designation	ISO Designation (Metric)	Cermet				Uncoated			PCD					Applicable mills
			NS740	N308			UX30	TH10		DX140					
	SECN422TN	SECN120308TN	●	●			●								EGE4000 (Former products) QHE4000
	SECN422FN	SECN120308FN						●							
	SEEN422TN	SEEN120308TN	●	●			●								
	SEEN422FN	SEEN120308FN						●							
-DIA	SECN422FN-DIA	SECN120308FN-D								●					

DX140: Packing quantity = 1pc.

●: Line up

Milling Insert

● **SEEN1203AFTNCR-14, SEKN42AFTN, SEKN42AFFN, SEKN42AFTN16, SEKR42AFSR-MJ, SEKR1203AFPN-MS, SEKR1203AFTN-MJ, SEMR1203AFTN-MJ**

Shape	Designation	ISO Designation (Metric)	Coated						Cermet		Uncoated		Applicable mills
			AH120	AH130	AH140	GH330	T3130		NS740		TH10	UX30	
	SEEN1203AFTNCR-14								●				TGE4400I
	SEKN42AFTN	**SEKN1203AFTN**	●	●	●	●						●	EGE4400
	SEKN42AFFN	**SEKN1203AFFN**									●		(Former products)
	SEKN42AFTN16	**SEKN1203AFTN-16**					●		●				
	SEKR42AFSR-MJ	**SEKR1203AFSR-MJ**				●	●						
 SEKR-MJ	**SEKR1203AFPN-MS**				●								
	SEKR1203AFTN-MJ								●				
	SEMR1203AFTN-MJ								●				
 SEMR-MJ													
 -MS													

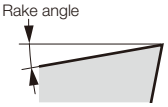
● **SECN42EFTRCR, SEEN42EFTRCR, SEKN42EFTR, SEKN42EFFR**

Shape	Designation	ISO Designation (Metric)	Coated			Cermet			Uncoated					Applicable mills
			GH330	T3130		NS740			UX30	TH10				
	SECN42EFTRCR	**SECN1203EFTR**				●								EGE4100
	SEEN42EFTRCR	**SEEN1203EFTR**				●								(Former products)
	SEKN42EFTR	**SEKN1203EFTR**	●	●		●								
	SEKN42EFFR	**SEKN1203EFFR**								●				

●: Line up

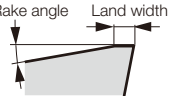
Milling Insert

● SEGW12X4ZEFR, SEGW12X4ZEPR, SEGT12X4ZEFR-AJ, SEGW12X4ZEFR-D, SEGW12X4ZEFR-WD, SEGW12X4ZEFR-BD

Shape	Designation	Coated			Cermet	Uncoated	PCD		Applicable mills
		AH120	AH140	DS1100	NS740	KS05F	DX140		
	SEGW12X4ZEFR					●			EFE12R... Page D138
	SEGW12X4ZEPR	●	●		●				
	SEGT12X4ZEFR-AJ			●		●			
	SEGW12X4ZEFR-D						●		
	SEGW12X4ZEFR-WD						●		
	SEGW12X4ZEFR-BD						●		
Rake angle  -AJ									
-D (General insert)									
-WD (Wiper insert)									
-BD (Wiper insert)									

DX140: Packing quantity = 1pc.

●SEKR1504AFSR-MJ

Shape	Designation	Coated				Applicable mills
		T3130				
	SEKR1504AFSR-MJ	●				(Former products)
Rake angle Land width  -MJ						

●: Line up

Milling Insert

● **SNCN43Z..., SNKF43Z..., SNKN43ZTN**

Shape	Designation	Coated			Cermet			Ceramic		Uncoated						Applicable mills
		T1115	T3130		NS740	N308		FX105		UX30	TH10					
	SNCN43ZFN										●					TGN4200R-A Page D159
	SNCN43ZTN				●	●				●						
	SNKF43ZFN										●					
	SNKF43ZTN	●								●						
	SNKN43ZTN	●	●		●			●		●						

● **SNMU1706ANPR-MJ, SNHU1706ANPR-MJ, SNMU1706ANTR-ML, SNHU1706ANTR-ML, SNHU1706ANFN-W**

Shape	Designation	Coated														Applicable mills
		AH120	AH140	AH725	AH3135	T1215										
	SNMU1706ANPR-MJ		●	●	●	●										DOOCTO DOQUAD
	SNHU1706ANPR-MJ		●	●												
Rake angle Land width	**SNMU1706ANTR-ML**	●			●											TAN07... Page D121
	SNHU1706ANTR-ML	●														
	SNHU1706ANFN-W	●														
-MJ																
Land width Rake angle																
-ML																

● **SNEN12**Z...**

Shape	Designation	Uncoated														Applicable mills
		UX30	TH10													
	SNEN12T2ZFN		●													SVN4000 Page D183
	SNEN12T2ZTN	●														
Land width	**SNEN1233ZFN**		●													
Rake angle	**SNEN1233ZTN**	●														

●: Line up

Milling Insert

● **SNGU1307ANEN-MJ, SNGU1307ANEN-W, SNGU1307ANEN-MH, SNMU1307ANEN-MJ**

Shape	Designation	Coated												Applicable mills
		AH120	AH3135	T3225	T1215									
	SNGU1307ANEN-MJ	●	●	●										DOTMILL TASN13... Page D118
	SNGU1307ANEN-W	●	●											
	SNGU1307ANEN-MH			●										
	SNMU1307ANEN-MJ	●	●	●	●									

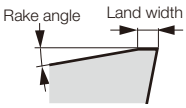
● **SNMN1204**TN**

Shape	Designation	Coated			Ceramic		Uncoated							Applicable mills
		AH120	T1115	T3130	FX105		UX30							
	SNMN120408TN				●									TGN4200R-A Page D159
	SNMN120412TN	●	●	●	●		●							
	SNMN120416TN				●									
	SNMN120420TN				●									
	SNMN120424TN				●									

●: Line up

Milling Insert

● SPCN42..., SPEN42..., SPKN42..., SPKR42SSR-MJ, SPGN120312TN

Shape	Designation	Coated					Cermet			Ceramic		Uncoated				Applicable mills
		AH120	AH140	GH330	T1115	T3130	NS740	N308		FX105		UX30	TH10			
	SPCN42STR						●	●				●				TGP4100RBAE Page D157
	SPCN42SFR												●			
	SPEN42STR						●									
	SPKN42STR	●	●	●	●	●	●	●		●		●				
	SPKN42STL						●					●				
	SPKN42SFR												●			
	SPKN42SFL												●			
	SPKR42SSR-MJ			●	●	●										
	SPGN120312TN									●						
	SPEN423TN					●	●					●				
	SPEN423FN												●			

● SPGN120412TN

Shape	Designation	Coated			Ceramic										Applicable mills
		T1115			FX105										
	SPGN120412TN	●			●										QFP4000 (Former products)

● SPHA**FNW

Shape	Designation	Cermet			Uncoated										Applicable mills
		N308			TH10										
	SPHA431FNW	●			●										SFP4000R Page D167 EFP4000R Page D167
	SPHA435FNW	●			●										

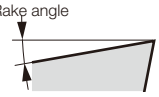
●: Line up

Milling Insert

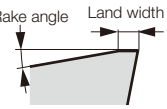
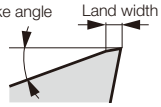
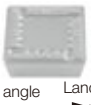
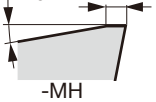
● SPMA422...

Shape	Designation	Cermet			Uncoated									Applicable mills
		NS740	N308		UX30	TH10								
	SPMA422TN	●	●		●									ECP4400R Page D260
	SPMA422FN					●								

● SPMP..., SPMM**ERD

Shape	Designation	Coated												Applicable mills
		T313W												
	SPMP831DS	●												TCB... Page D261
	SPMP042ERD	●												
Rake angle	SPMM322ERD	●												
	SPMM432ERD	●												

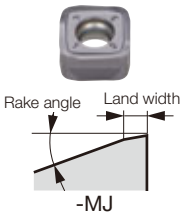
● SPMR1605PPTR-MJ, SPMR1605PPPR-ML, SPMR1605PPTR-MH

Shape	Designation	Coated			Uncoated									Applicable mills
		GH330	T1115	T3130	UX30									
	SPMR1605PPTR-MJ	●	●	●	●									TPP16... Page D107
	SPMR1605PPPR-ML	●												
Rake angle Land width	SPMR1605PPTR-MH	●		●	●									
 -MJ														
Rake angle Land width  -ML														
														
Rake angle Land width  -MH														

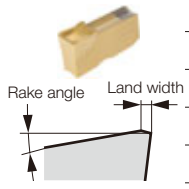
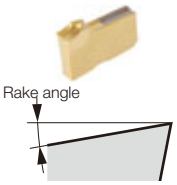
●: Line up

Milling Insert

● SQMU1206ZSR-MJ

Shape	Designation	Coated														Applicable mills
		AH120	AH130	AH725	T3130											
	SQMU1206ZSR-MJ	●	●	●	●											DOFEEDQUAD TXQ... Page D021

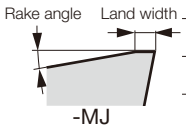
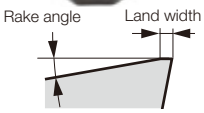
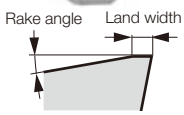
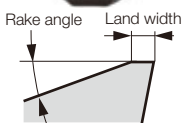
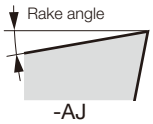
● SSM..., SSS...

Shape	Designation	Coated														Applicable mills
		GH130														
	SSM22N	●														TUNGMSLIT S/ASG... Page D172
	SSM31N	●														
	SSM41N	●														
	SSS16N	●														
	SSS22N	●														
	SSS31N	●														
	SSS41N	●														

●: Line up

Milling Insert

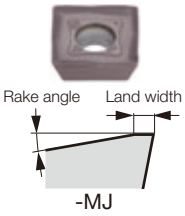
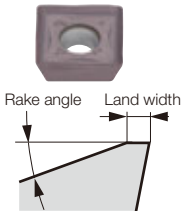
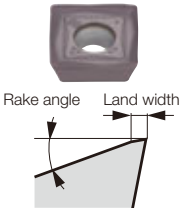
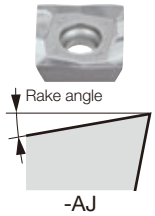
● SWMT13T3AFPR-MJ, SWMT13T3AFER-ML, SWMW13T3AFTR, SWMT13T3AFPR-HJ, SWMT13T3AFPR-MS, SWGT13T3AFPR-MJ, SWGT13T3AFFR-AJ

Shape	Designation	Coated										Cermet		Uncoated		Applicable mills
		AH120	AH130	AH140	AH3135	T1115	T1215	T3130	DS1100			NS740		KS05F		
 -MJ	SWMT13T3AFPR-MJ	●	●	●	●	●	●	●				●				TUNGMILL
	SWMT13T3AFER-ML	●														TAW13...
	SWMW13T3AFTR	●				●	●	●				●				Page D131
	SWMT13T3AFPR-HJ	●	●	●		●	●	●								EAW13...
	SWMT13T3AFPR-MS		●	●	●											Page D132
	SWGT13T3AFPR-MJ	●										●				
	SWGT13T3AFFR-AJ								●					●		
 -ML																
-FL																
 -HJ																
 -MS																
 -AJ																

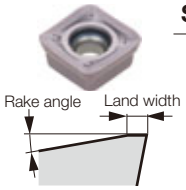
●: Line up

Milling Insert

● **SWMT1304PDPR-MJ, SWMT1304PDER-ML, SWMT1304PDPR-MS, SWGT1304PDPR-MJ, SWGT1304PDFR-AJ**

Shape	Designation	Coated							Cermet	Uncoated			Applicable mills
		AH120	AH130	AH140	T1115	T1215	T3130	DS1100	NS740	KS05F			
 -MJ	**SWMT1304PDPR-MJ**	●	●	●	●	●	●		●				TUNGMILL TPW13... Page D074 EPW13... Page D075
	SWMT1304PDER-ML	●											
	SWMT1304PDPR-MS		●	●									
	SWGT1304PDPR-MJ	●							●				
	SWGT1304PDFR-AJ							●		●			
 -ML													
 -MS													
 -AJ													

● **SWMT1506ZER-MJ**

Shape	Designation	Coated											Applicable mills
		AH120	AH3135										
 -MJ	**SWMT1506ZER-MJ**	●	●										MILLQFEED TXSW... Page D024

●: Line up

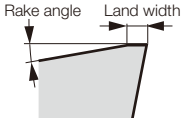
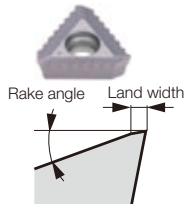
Milling Insert

Insert

● T*-R...

Shape	Designation	Coated												Applicable mills
		GH330												
	T1-R14	●												Single tooth threading mills Page D263
	T1-R28	●												
	T2-R14	●												
	T2-R28	●												

● TCGT160608PDER-MJ, TCMT160620PDER-NMJ

Shape	Designation	Coated												Applicable mills
		AH120	AH3135											
	TCGT160608PDER-MJ	●	●											TUNG-TRISHRED LPTC16... Page D047 TPTC16... Page D047 EPTC16... Page D048
	TCMT160620PDER-NMJ	●	●											
 -MJ														
 -NMJ														

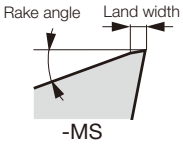
●TDMN**N

Shape	Designation	Cermet			Uncoated									Applicable mills
		NS740			TH10	UX30								
	TDMN110304TN	●				●								ESD2000 (Former products)
	TDMN110304FN				●									
	TDMN110308TN	●				●								

●: Line up

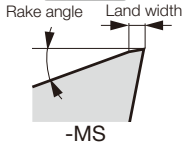
Milling Insert

● TECN32...,TEEN32..., TECN32ZFR-DIA, TEKR1603PEPR-MS

Shape	Designation	Coated							Cermet		Uncoated		PCD			Applicable mills
		AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740	N308	UX30	TH10	DX140			
	TECN32ZFR											●				TSE3000R Page D109
	TECN32ZTR								●	●	●					
	TEEN32ZFR											●				ESE3000R Page D109
-DIA	TEEN32ZTR	●	●	●	●	●	●	●	●	●	●					
	TECN32ZFR-DIA												●			
	TEKR1603PEPR-MS			●												
 -MS																

DX140: Packing quantity = 1pc.

● TECN43..., TEEN43..., TECN43ZFR-DIA, TEKR2204PEPR-MS

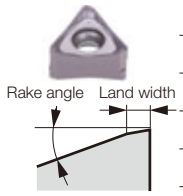
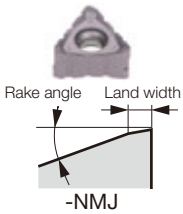
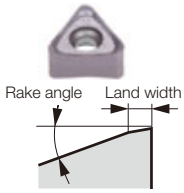
Shape	Designation	Coated							Cermet		Uncoated		PCD			Applicable mills
		AH120	AH130	AH140	AH330	GH330	T1115	T3130	NS740	N308	UX30	TH10	DX140			
	TECN43ZFR											●				TSE4000RIA Page D112
	TECN43ZTR								●	●	●					
	TEEN43ZFR											●				ESE4000R Page D113
-DIA	TEEN43ZTR	●	●	●	●	●	●	●	●	●	●					
	TECN43ZFR-DIA												●			
	TEKR2204PEPR-MS			●												
 -MS																

DX140: Packing quantity = 1pc.

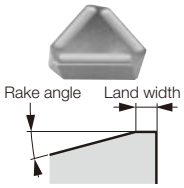
●: Line up

Milling Insert

● **TNGU120708PER-MJ, TNGU120708PER-NMJ, TNMU1207R16PER-MJ, TNMU120708PER-MJ, TNMU120708PER-NMJ**

Shape	Designation	Coated				Applicable mills
		AH120	AH3135	T1215	T3225	
 TNGU-MJ	**TNGU120708PER-MJ**	●	●			DOFTRI FORCE TPTN12... Page D034 EPTN12... Page D034
	TNGU120708PER-NMJ	●	●			
	TNMU1207R16PER-MJ	●	●			
	TNMU120708PER-MJ	●	●	●	●	
	TNMU120708PER-NMJ	●	●			
 -NMJ						
 TNMU-MJ						

●**TNKF64ZTR**

Shape	Designation	Uncoated			Applicable mills
		UX30			
	**TNKF64ZTR**	●			TPN6400I (Former products)

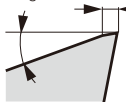
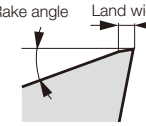
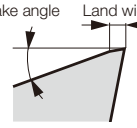
●: Line up

Milling Insert

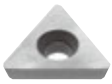
●TNMN43ZENS

Shape	Designation	Uncoated												Applicable mills
		UX30												
	TNMN43ZENS	●												TSN4000 ESN4000 (Former products)

● TOMT**PDER-MJ, TOMT150608PDER-NMJ, TOGT**PDFR-AJ

Shape	Designation	Coated			Uncoated									Applicable mills
		AH120	AH3135	T1215	KS05F									
	TOMT060302PDER-MJ	●	●											TUNG-TRI
	TOMT060304PDER-MJ	●	●											TPA06... Page D038
Rake angle Land width 	TOMT060308PDER-MJ	●	●	●										EPA06... Page D038
	TOMT100404PDER-MJ	●	●											HPA06... Page D039
	TOMT100408PDER-MJ	●	●	●										TPA10... Page D039
-MJ	TOMT100416PDER-MJ	●	●											TLA10... Page D040
	TOMT150604PDER-MJ	●	●											EPA10... Page D040
	TOMT150608PDER-MJ	●	●	●										HPA10... Page D041
Rake angle Land width 	TOMT150616PDER-MJ	●	●											TPA15... Page D041
	TOMT150620PDER-MJ	●	●											TLA15... Page D042
	TOMT150608PDER-NMJ	●	●											EPA15... Page D043
-NMJ	TOGT100404PDFR-AJ				●									
	TOGT100408PDFR-AJ				●									
Rake angle Land width 														
-AJ														

● TPCA43ZTRW1, TPMA432TNW1

Shape	Designation	Cermet			Uncoated									Applicable mills
		NS740			UX30	TH10								
	TPCA43ZTRW1					●								PES1500... Page D103
	TPMA432TNW1	●			●	●								

●: Line up

Milling Insert

●TPMN**TN

| Shape | Designation | Cermet | | |

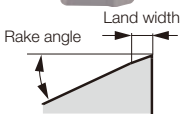
Milling Insert

● WDCN42ZFR-DIA

Shape	Designation	PCD												Applicable mills
		DX140												
Wiper insert -DIA	WDCN42ZFR-DIA	●												EMD4400RI Page D149 EGD4400 Page D154

DX140: Packing quantity = 1pc.

● WNGU**TN-MJ

Shape	Designation	Coated												Applicable mills
		AH120	AH130	AH725										
 -MJ	WNGU060308TN-MJ	●	●	●										TUNGUSLOT UNIVERSAL ASW 06/07/09... Page D177 TSW 06/07/09... Page D178
	WNGU060316TN-MJ	●	●	●										
	WNGU07T308TN-MJ	●	●	●										
	WNGU07T316TN-MJ	●	●	●										
	WNGU090408TN-MJ	●	●	●										
	WNGU090416TN-MJ	●	●	●										

● WPAN42SFR

Shape	Designation	Cermet			Uncoated									Applicable mills
		N308			TH10									
Wiper insert (Two corner type)	WPAN42SFR	●			●									TGP4100RBAE Page D157

● WPAN42SFRS

Shape	Designation	Uncoated												Applicable mills
		TH10												
Wiper insert (One corner type)	WPAN42SFRS	●												TGP4100RBAE Page D157

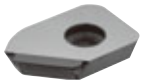
●: Line up

Milling Insert

● WPMT**ZPR..., WPMT**ZPR-ML, WPMT**-MH, WPMT**-DML, WPMW**-ZSR

Shape	Designation	Coated															Applicable mills
		AH120	AH130	AH140	AH730	T3130											
	WPMW05H315ZPR	●		●		●											MILLFEED
	WPMT05H315ZPR-ML	●		●		●											TXP05/06/08/09...
	WPMT05H315ZPR-MH	●		●													Page D026
	WPMT05H315ZPR-DML				●												EXP05/06/08/09...
	WPMW06X415ZPR	●		●		●											Page D027
Rake angle Land width	WPMT06X415ZPR-ML	●	●	●		●											HXP... Page D266
	WPMT06X415ZPR-MH	●		●													
-ML	WPMT06X415ZPR-DML				●												
	WPMT080615ZSR	●	●	●		●											
	WPMT080615ZPR-ML	●	●	●		●											
	WPMT080615ZSR-MH	●		●													
-MH	WPMT080615ZPR-DML				●												
	WPMT090725ZSR	●		●		●											
	WPMT090725ZPR-ML	●	●	●		●											
Rake angle Land width	WPMT090725ZSR-MH	●	●	●													
	WPMT090725ZPR-DML				●												
-DML																	

● WWCW13T3AFER-WS, WWCW13T3AFFR-WS, WWCW13T3AFFR-WD

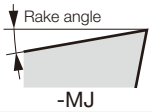
Shape	Designation	Coated			Cermet		Uncoated		PCD					Applicable mills
		GH110	DS1100		NS740		KS05F		DX140					
	WWCW13T3AFER-WS	●			●									TUNGMILL
	WWCW13T3AFFR-WS		●				●							TAW13...
	WWCW13T3AFFR-WD								●					Page D131
														EAW13...
-WD														Page D132

DX140: Packing quantity = 1pc.

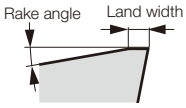
●: Line up

Milling Insert

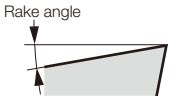
● WXHU**R-MJ

Shape	Designation	Coated												Applicable mills
		AH110												
 -MJ	WXHU040305R-MJ	●												DOMMILL HFWX04... Page D193
	WXHU040310R-MJ	●												

● XCET310404ER

Shape	Designation	Coated		Cermet		Uncoated								Applicable mills
		AH330		NS740		UX30								
	XCET310404ER	●		●		●								ECC31... Page D258

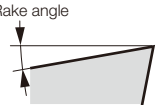
● XVCT16**R-AJ

Shape	Designation	Uncoated												Applicable mills
		TH10												
 -AJ	XVCT160504R-AJ	●												TUNG-ALUMILL TPV16... Page D086 EPV16... Page D086
	XVCT160508R-AJ	●												
	XVCT160512R-AJ	●												
	XVCT160516R-AJ	●												
	XVCT160520R-AJ	●												
	XVCT160530R-AJ	●												
	XVCT160532R-AJ	●												
	XVCT160540R-AJ	●												
	XVCT160550R-AJ	●												

●: Line up

Milling Insert

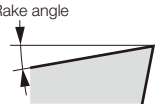
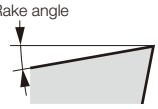
● XVGT**EC-MJ, XVGT**FP-MJ, XVGT**FC-AJ, XVGT**FP-AJ

Shape	Designation	Coated												Applicable mills
		AH730	DS1200											
Center edge insert	XVGT06H205EC-MJ	●												HYBRIDTACMILL EVH... Page D252
	XVGT07X305EC-MJ	●												
	XVGT09X405EC-MJ	●												
	XVGT06H205EP-MJ	●												
Peripheral edge insert	XVGT07X305EP-MJ	●												
	XVGT09X405EP-MJ	●												
	XVGT06H205FC-AJ		●											
	XVGT07X305FC-AJ		●											
Rake angle  -MJ	XVGT09X405FC-AJ		●											
	XVGT06H205FP-AJ		●											
	XVGT07X305FP-AJ		●											
Rake angle -AJ	XVGT09X405FP-AJ		●											

●: Line up

Milling Insert

● XHGR**ER-MJ, XHGR**FR-AJ

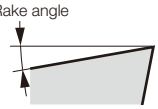
Shape	Designation	Coated												Applicable mills
		AH730	DS1200											
Rake angle  -MJ Rake angle  -AJ	XHGR110202ER-MJ	●												HYBRIDTACMILL EPH11/13/18... Page D089
	XHGR110204ER-MJ	●												
	XHGR110205ER-MJ	●												
	XHGR110208ER-MJ	●												
	XHGR110210ER-MJ	●												
	XHGR110212ER-MJ	●												
	XHGR110215ER-MJ	●												
	XHGR110216ER-MJ	●												
	XHGR110220ER-MJ	●												
	XHGR130202ER-MJ	●												
	XHGR130204ER-MJ	●												
	XHGR130205ER-MJ	●												
	XHGR130208ER-MJ	●												
	XHGR130210ER-MJ	●												
	XHGR130212ER-MJ	●												
	XHGR130215ER-MJ	●												
	XHGR130216ER-MJ	●												
	XHGR130220ER-MJ	●												
	XHGR18T202ER-MJ	●												
	XHGR18T204ER-MJ	●												
	XHGR18T205ER-MJ	●												
	XHGR18T208ER-MJ	●												
	XHGR18T210ER-MJ	●												
	XHGR18T212ER-MJ	●												
	XHGR18T215ER-MJ	●												
	XHGR18T216ER-MJ	●												
	XHGR18T220ER-MJ	●												
	XHGR110200FR-AJ		●											
	XHGR110202FR-AJ		●											
	XHGR110204FR-AJ		●											
	XHGR110205FR-AJ		●											
	XHGR110208FR-AJ		●											
	XHGR110210FR-AJ		●											
	XHGR110212FR-AJ		●											
	XHGR110215FR-AJ		●											
	XHGR110216FR-AJ		●											
	XHGR110220FR-AJ		●											
	XHGR130200FR-AJ		●											
	XHGR130202FR-AJ		●											
	XHGR130204FR-AJ		●											
	XHGR130205FR-AJ		●											
	XHGR130208FR-AJ		●											
	XHGR130210FR-AJ		●											
	XHGR130212FR-AJ		●											
	XHGR130215FR-AJ		●											
	XHGR130216FR-AJ		●											
	XHGR130220FR-AJ		●											
	XHGR18T200FR-AJ		●											
	XHGR18T202FR-AJ		●											
	XHGR18T204FR-AJ		●											
	XHGR18T205FR-AJ		●											
	XHGR18T208FR-AJ		●											
	XHGR18T210FR-AJ		●											
	XHGR18T212FR-AJ		●											
	XHGR18T215FR-AJ		●											
	XHGR18T216FR-AJ		●											
	XHGR18T220FR-AJ		●											

●: Line up

● XXGT**EC-MJ, XXGT**EP-MJ, XXGT**FC-AJ, XXGT**FP-AJ

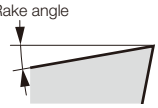
Shape	Designation	Coated												Applicable mills
		AH730	DS1200											
Center edge insert	XXGT06H205EC-MJ	●												HYBRIDTACMILL EXH... Page D004
	XXGT07X305EC-MJ	●												
	XXGT09X408EC-MJ	●												
Peripheral edge insert	XXGT06H205FC-AJ		●											
	XXGT07X305FC-AJ		●											
	XXGT09X408FC-AJ		●											
	XXGT06H205EP-MJ	●												
	XXGT07X305EP-MJ	●												
	XXGT09X408EP-MJ	●												
	XXGT06H205FP-AJ		●											
	XXGT07X305FP-AJ		●											
	XXGT09X408FP-AJ		●											

Rake angle



-MJ

Rake angle

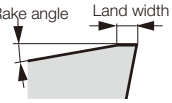


-AJ

● XXMU**PR-MJ

Shape	Designation	Coated												Applicable mills
		AH120	AH140											
	XXMU08T204PR-MJ	●	●											EVX... Page D255 HVX... Page D267
	XXMU10H308PR-MJ	●	●											
	XXMU12X408PR-MJ	●	●											
	XXMU16X508PR-MJ	●	●											

Rake angle Land width



-MJ

●: Line up

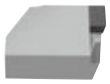
Milling Insert

● **YDEN0905PDFR-D, YDEN0905PDFR-WD, YDEN0905PDFR-BD**

Shape	Designation	PCD												Applicable mills
		DX140												
General insert	**YDEN0905PDFR-D**	●												**EDPD09...** Page D141
	YDEN0905PDFR-WD	●												
	YDEN0905PDFR-BD	●												
Wiper insert														
Wiper insert														

DX140: Packing quantity = 1pc.

● **YDEN1505PDFR-D, YDEN1505PDFR-WD**

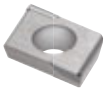
Shape	Designation	PCD												Applicable mills
		DX140												
General insert	**YDEN1505PDFR-D**	●												**EDPD15...**
	YDEN1505PDFR-WD	●												
 Wiper insert														

DX140: Packing quantity = 1pc.

●: Line up

Milling Insert

● YPEB12X3-1A**-D, YPEB12X3-1P**-D, YPEB12X3-2A**-D, YPEB12X3-FP**-D, YPEB12X3-2P07R-D

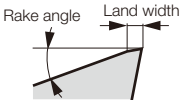
Shape	Designation	PCD										Applicable mills
		DX160										
-1A/P	YPEB12X3-1A01R-D	●										TUNGSMILL TPYP12... Page D136 EPYP12... Page D136
	YPEB12X3-1A02R-D	●										
	YPEB12X3-1A07R-D	●										
	YPEB12X3-1P02R-D	●										
	YPEB12X3-1P07R-D	●										
-FP	YPEB12X3-FP02R-D	●										
	YPEB12X3-FP07R-D	●										
 -2A/P	YPEB12X3-2A01R-D	●										
	YPEB12X3-2A02R-D	●										
	YPEB12X3-2A07R-D	●										
	YPEB12X3-2P07R-D	●										

DX160: Packing quantity = 2pcs.

● ZDCA**TN

Shape	Designation	Uncoated										Applicable mills
		UX30										
	ZDCA0804TN	●										TBF1000 (Former products)
	ZDCA1105TN	●										

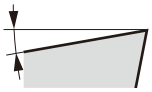
● ZDMT**-MJ

Shape	Designation	Coated										Applicable mills
		AH120										
	ZDMT4005-MJ	●										EBD... Page D214
	ZDMT5006-MJ	●										HBD... Page D270
 -MJ												

●: Line up

Milling Insert

● **ZFBM**-MJ, ZFRM**-MJ**

Shape	Designation	Coated												Applicable mills
		AH710	AH725											
Rake angle ZFBM-MJ	**ZFBM080R00-MJ**	●	●											BALL FINISH NOSE EBFM... Page D188 HBFM... Page D189
	ZFBM100R00-MJ	●	●											
	ZFBM120R00-MJ	●	●											
	ZFBM160R00-MJ	●	●											
	ZFBM200R00-MJ	●	●											
	ZFBM250R00-MJ	●	●											
	ZFBM300R00-MJ	●	●											
	ZFBM320R00-MJ	●	●											
Rake angle  ZFRM-MJ	**ZFRM120R05-MJ**	●	●											
	ZFRM120R10-MJ	●	●											
	ZFRM160R05-MJ	●	●											
	ZFRM160R10-MJ	●	●											
	ZFRM160R15-MJ	●	●											
	ZFRM200R10-MJ	●	●											
	ZFRM200R15-MJ	●	●											

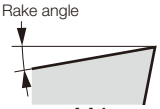
●: Line up

Milling Insert

● ZNCA**FN, ZNMM**EN

Shape	Designation	Uncoated											Applicable mills
		UX30	TH10										
	ZNCA1002FN2	●	●										TBN1000 Page D210
	ZNCA1203FN	●	●										
	ZNCA1603FN	●	●										
	ZNCA2004FN	●	●										
	ZNCA2505FN	●	●										
	ZNCA3005FN	●	●										
	ZNMM2004EN	●											
	ZNMM2505EN	●											
	ZNMM3005EN	●											

● ZPET**-MJ

Shape	Designation	Coated											Applicable mills
		AH120	AH330										
	ZPET2004-MJ	●	●										EBP... Page D212
	ZPET2505-MJ	●	●										HBP... Page D269
	ZPET3006-MJ	●	●										
Rake angle  -MJ	ZPET3206-MJ	●	●										

● ZPCW**-QBN

Shape	Designation	T-CBN											Applicable mills
		BX950											
	ZPCW2003-QBN	●											EBB... Page D213
	ZPCW25H3-QBN	●											
	ZPCW30T3-QBN	●											
	ZPCW4004-QBN	●											
	ZPCW5004-QBN	●											

BX950: Packing quantity = 1pc.

●: Line up

Milling Insert CBN

● **2QP-SNGN..**

Shape	Designation	CBN										Applicable mills
		BX910										
	2QP-SNGN090308	●										
	2QP-SNGN090312	●										

● **2QP-SPGW..., 2QP-SPGN...**

Shape	Designation	CBN										Applicable mills
		BX910										
2QP-SPGW	**2QP-SPGW09T308**	●										
	2QP-SPGW09T312	●										
	2QP-SPGW120408	●										
	2QP-SPGW120412	●										
	2QP-SPGW120416	●										
2QP-SPGN	**2QP-SPGN090308**	●										
	2QP-SPGN090312	●										

● **3QP-TPGW..., 3QP-TPGN...**

Shape	Designation	CBN										Applicable mills
		BX910										
3QP-TPGW	**3QP-TPGW110308**	●										
	3QP-TPGN110308	●										
	3QP-TPGN110312	●										
3QP-TPGN												

●: Line up

Milling Insert CBN

● S-CNGN..., S-RNGN..., S-SNGN..., S-TNGN...

Shape	Designation	CBN												Applicable mills
		BXC90												
S-CNGN	S-CNGN090308	●												
	S-CNGN090312	●												
	S-CNGN120408	●												
	S-CNGN120412	●												
	S-RNGN090300	●												
	S-RNGN120400	●												
S-RNGN	S-SNGN090308	●												
	S-SNGN090312	●												
	S-SNGN120308	●												
	S-SNGN120312	●												
S-SNGN	S-SNGN120408	●												
	S-SNGN120412	●												
	S-TNGN110308	●												
S-TNGN	S-TNGN110312	●												
	S-TNGN160408	●												
	S-TNGN160412	●												

●: Line up

MEMO